2/6/27

Vol. XXV. Part 5.

[Registered at the General Post Office, Melbourne, for transmission by Post as a Newspaper.]

The Journal of the Department of Agriculture of Victoria, Australia.

May, 1927.

PRINCIPAL CONTENTS

Plant Pathology—Studies in Europe and America
Feeding for Milk Production
Crop and Fallow Competitions
Registration of Stallions—Annual Report
Wheat Pickling Methods
Cool Storage of Valencia Late Oranges
Cultivation of Winter Flowers
Poultry Parasites

PRICE THREEPENCE. (Annual Subscription—Victoria, Interstate, and N.Z., 3/-; British and Foreign, 5/-.)

Sow Brunning's

GRASSES AND CLOVERS

For Permanent Pasture

BRUNNING'S GRASS & CLOVER SEEDS are of the highest purity and growth. We not only possess the latest and most up-to-date seed cleaning machinery, but also the necessary experience and knowledge to get the best results from same.

The best seed is always the cheapest

Sow the following:—

PERENNIAL RYE GRASS
CREEPING BENT
CLUSTER CLOVER
YORK FOG GRASS
WALLABY GRASS
CRESTED DOGSTAIL
WHITE DUTCH CLOVER
COWGRASS
SWEET VERNAL
SHEEP'S TREFOIL
"TARWEI" STRAWBERRY CLOVER
ALSIKE
LOTUS MAJOR
SUBTERRANEAN CLOVER

Any information or advice regarding the best mixture for your requirements will be gladly given on request

BRUNNING'S

F. H. BRUNNING PTY. LTD.,

New Address:
57 Elizabeth St.,
MELBOURNE.

THE JOURNAL

OF

THE DEPARTMENT OF AGRICULTURE,

VICTORIA, AUSTRALIA.

CONTENTS.—MAY, 1927.

		PAGE
Plant Pathology—Studies in Europe and America	*D. B. Adam, B.Ag.Sc.*	257
Feeding for Milk Production	... *R. T. Archer*	262
Sea Lake Fallow and Crop Competition	*J. Brake, B.Ag.Sc.*	266
North-Eastern Mallee Fallow Competitions ...	*R. G. Thomas, M.Ag.Sc.*	269
Valencia Late Oranges—Cool Storage Experiments ..	*G. B. Tindale, B.Ag.Sc.*	276
Registration of Stallions—Seventh Annual Report ...	*E. A. Kendall, B.V.Sc.*	280
Stallion Register—List of Stallions Refused Registration, but whose owners have been permitted to retain them for breeding purposes with their own mares	... ...	283
Stallion Parades—Time Table, 1927	... ...	284
Wheat Pickling Methods	*H. A. Mullett, B.Ag.Sc.*	290
Elmore Crop and Fallow Competition	*L. C. Bartels, B.Ag.Sc.*	293
The Site for an Orchard	... *H. W. Davey*	296
Propagation and Selection of Fruit Trees	... *J. M. Ward*	300
The Cultivation of Winter Flowers	... *Geo. Russ*	303
Poultry Parasites	... *H. F. Clinton*	307
Supplementary List of Fertilizers Registered for 1927	... ...	312
Planting and Reconstitution of Vineyards	... ...	314
Important Results with Gypsum	.. ..	315
Export of Grapes—Trial Shipment to Great Britain	... ...	316
Orchard and Garden Notes	... ...	317
Reminders for June	... ...	319

COPYRIGHT PROVISIONS AND SUBSCRIPTION RATES.

The Articles in the Journal of the Department of Agriculture of Victoria are protected by the provisions of the Copyright Act. Proprietors of newspapers wishing to republish any matter are at liberty to do so, *provided the Journal and author are both acknowledged.*

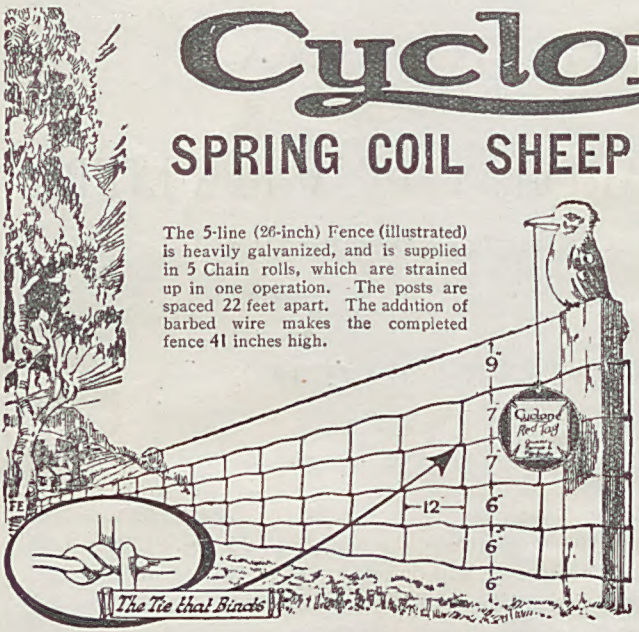
The Journal is issued monthly. The subscription, which is payable in advance and includes postage, is 3s. per annum for the Commonwealth and New Zealand, and 5s. for the United Kingdom and Foreign Countries. Single copy, Threepence.

Subscriptions should be forwarded to the Director of Agriculture, Melbourne. A complete list of the various publications issued by the Department of Agriculture will be supplied by the latter.

W. & W. 1021.

Cyclone

SPRING COIL SHEEP FENCE



The 5-line (26-inch) Fence (illustrated) is heavily galvanized, and is supplied in 5 Chain rolls, which are strained up in one operation. The posts are spaced 22 feet apart. The addition of barbed wire makes the completed fence 41 inches high.

Securely Holds Crossbred Sheep

£23/10/-
PER MILE

6/9 per chain for less than ½ mile

This Fence is Cheaper (mile for mile) than Plain Wire Fencing.

CYCLONE CATALOGS POST FREE

CYCLONE FENCE & GATE CO. PTY. LTD.
189-191 WILLIAM STREET, MELBOURNE — *Phone Central 3228*

ALSTON

WINDMILLS
FOR ALL WATER SUPPLIES

Their Reliability is Proverbial. Fitted with Machine-cut Gears, Ball Bearings, Auto Lubrication, and Storm-Proof Regulators. All working Parts Enclosed in a Dust-Proof Case and run in oil.

If unable to procure locally write us direct.

James Alston & Sons Pty. Ltd.
Queens Bridge
Melbourne

OVER 50,000 ALSTON MILLS IN USE. EXPERT ADVICE & 70 PAGE CATALOGUE FREE ON APPLICATION

TROUGHING

For Watering or Feeding Sheep, Cattle, Horses, Calves and Pigs
ALL SIZES AND ALL LENGTHS

ALSTON'S Patent

Steel throughout. Put together with a wrench, no solder required. Cannot leak or pull apart, because the Alston Patent Coupling makes a perfectly watertight joint without grooves to fracture the galvanising while locking every section together as rigidly as a bridge.

The heavy Steel Angle Frame and heavily Galvanised Steel Sheets used, together with our patent coupling, are points which make the ALSTON TROUGHING superior to all others.

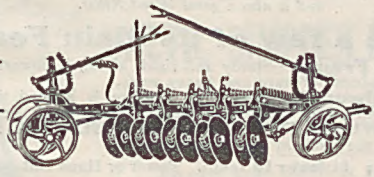
Send for illustrated leaflet.

JAMES ALSTON & SONS PTY. LTD.
QUEEN'S BRIDGE, MELBOURNE

Sunshine Farm Implements

THE "SUNDERCUT"

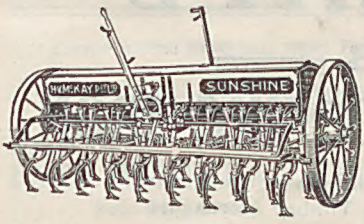
10 disc cuts 5 ft.



14 disc cuts 7 ft.

Largely used for Summer Fallowing in hard soil. Deals most effectively with paddy-melon, stinkwort, and other heavy weed growths. Is Stump-jump, and suitable for the roughest country. Tractor Levers if required.

THE "SUNTYNE"



Sizes .. 8, 12, 14, 16, 20, 24 rows
With .. 17, 25, 29, 33, 41, 47 tynes
Width .. 5, 7¼, 8½, 9½, 12, 14 feet

Combines the best Tyne Cultivator with the best Grain and Fertilizer Drill. Two implements in one. Saves Capital. Saves Labour. Sows scientifically and pays for itself by conserving the moisture and increasing the yield.

Ask for Catalogues and Price List of all Sunshine Implements
SENT POST FREE ON REQUEST

H. V. McKAY PTY. LTD.

Sunshine Harvester Works, Sunshine

Showrooms - - - 664 Bourke Street West, MELBOURNE

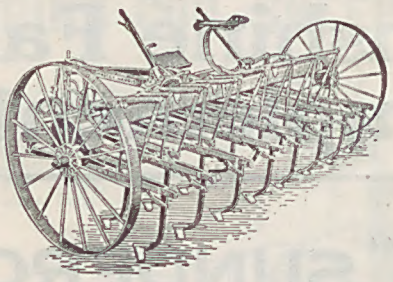
MASSEY-HARRIS

No. 15 STIFF-TOOTH CULTIVATOR

WITH FAMOUS POWER LIFT

□

POSITIVE AND QUICK ACTION



Syphon Oiler for Axles.

Oscillating Forecarriage.

Wide Range of Points.

Each tooth has a safety trip spring.

The Massey-Harris No. 15 Stiff-Tooth Cultivator is the ideal Implement for working up Fallow, and is also a great Weed Killer.

Here are a few of its Main Features:

Strong and Heavy Frame.—Sturdy and rigid, giving it powerful resistance to strains, and a tremendous capacity for hard and heavy work.

Pressure Applied through Lift.—The pressure is applied through the lift, and is regulated by convenient lever. Adjustable pressure provides for deep or shallow cultivation.

Sure Acting, Two-Wheel Driven Power Lift.—Quick and positive in action, raising and lowering the teeth in a few seconds.

SIZES: 8 feet—11 teeth; 11 feet—15 teeth. Power or Hand Lift. Tractor Hitch if desired.

Catalogue, also Prices and Terms, from our Local Agent, or write

Massey-Harris Co. Ltd., Melbourne

Branches: Sydney, Adelaide, Brisbane, Perth, Christchurch, N.Z.

LYSAGHT'S

—— ORB ——

CORRUGATED ROOFING IRON

Full supplies throughout Australia are obtainable from all leading Storekeepers and Timber Merchants

The "Banyule" Jersey Stud

HEIDELBERG, VICTORIA —— 8 miles from G.P.O.

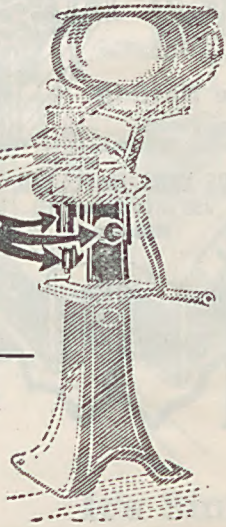
ALL GOVERNMENT TESTED

YOUNG STOCK FOR SALE

Inspection and Correspondence Welcomed. **C. GORDON LYON**

BALTIC
CREAM SEPARATOR

IT'S DIFFERENT HERE



The larger Baltics—50, 70, 90 and 125 gals. capacity, have the New Ball Bearing Spindle and Worm Wheel Shaft that has caused such a sensation and revolutionized the construction of big Separators. Write for full information about this, THE most important development for many years.

Ask for Booklet B.S.200, and please state number of cows you are milking.

BALTIC SIMPLEX MACHINERY Co.
PTY. LTD.
479-481 FLINDERS LANE, MELBOURNE

There are Baltics for the Smaller Dairies as well, ranging in price from **£4**

(W.-McF.)

LILYDALE LIME For the LAND

Farmers who have not used **Burnt Lime** should try it. The action of Burnt Lime on the land is **Immediate.** Farmers have the opportunity of obtaining the **well-known Lilydale Agricultural Lime.**
ANALYSIS—98% Calcium Oxide.

Apply—
DAVID MITCHELL ESTATE,
Sole Proprietors.

Head Office:
OLIVER'S LANE, MELBOURNE
Tel. Central 5725 and 5726.

THE SPRAYER that has for years stood the test against all other makes. Saves time, made in Single and Double Plunges, 3 and 4 horse power.

For thorough spraying it is unequalled, and its effectiveness is shown in the increased return and better quality fruit. Write now to the makers for catalogue.

RUSSELL & Co.
Manufacturers
BOX HILL ——— MELBOURNE

THE

Farmers & Settlers' Co-Operative Insurance Co.

OF AUSTRALIA LIMITED

Farmers and Graziers, Support this Company with all your Insurances, when Dividends and Bonuses to yourselves will be increased considerably.

Full Particulars from any Agency of the Victorian Producers' Company,
OR
360 COLLINS STREET, MELBOURNE

SCIENTIFICALLY FITTED GLASSES ENSURE COMFORT

IF you are in doubt as to whether you require glasses or not you should have your eyes tested by an expert. The Optical Service our Clients enjoy ensures comfort in wearing glasses that fit accurately.

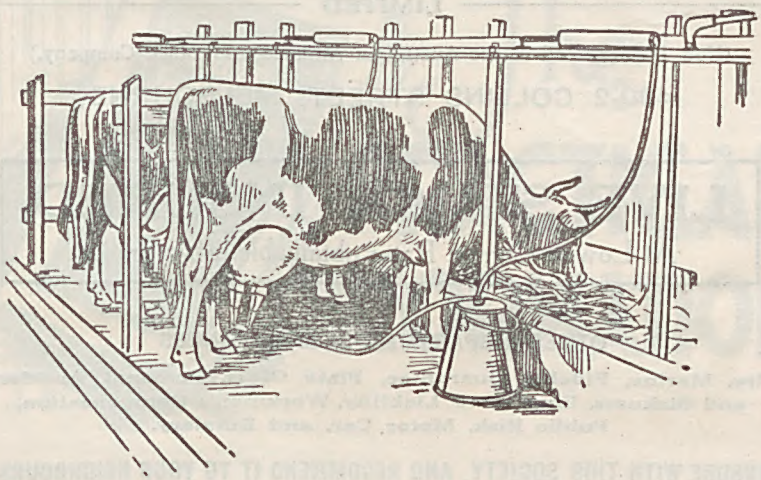
'Phone 6778 for an appointment

E. WOOD PTY. LTD. 95 ELIZABETH STREET — MELBOURNE —

OPHTHALMIC OPTICIANS

Stevenson

Emu Milking Machine



It's Simpler, Safer, Better and only Half the Price

Old Style Milker, 4 units, about	£223 0 0
EMU Milker, 4 units, (Engine and all Fittings)	£111 10 0
Difference	£111 10 0

THE EMU Bucket System Milker keeps a daily check on every cow in the herd and the extra bucket supplied free makes work easy for youngsters. The EMU Bucket System is more sanitary and the milk of the lowest bacterial count insuring highest returns. Takes but a fraction of the usual time to clean; easier on the cow, cleaner than hand milking, and increases production. Every plant guaranteed. Hundreds in use.

Write for all information—no obligation.

T. ROBINSON & COMPANY Pty. Ltd.

SPOTSWOOD, VIC. Showrooms: 536-538 Bourke St., Melbourne

'PHONE 7419 CENTRAL

.. THE ..

Australasian Mutual Insurance Society

LIMITED

(Now Incorporated in the Australian Alliance Assurance Company.)

400-2 COLLINS STREET, MELBOURNE

LIVE STOCK INSURED

At Lowest Current Rates obtainable in Australia.

OTHER DEPARTMENTS OF BUSINESS

Fire, Marine, Fidelity Guarantee, Plate Glass, Personal Accident and Sickness, Employers' Liability, Workmen's Compensation, Public Risk, Motor Car, and Burglary.

INSURE WITH THIS SOCIETY, AND RECOMMEND IT TO YOUR NEIGHBOURS

COCKBILL'S

BONE MEAL for FEEDING

CATTLE, PIGS, and all FARM STOCK

IS A SOURCE OF LIME, PHOSPHATES, AND PROTEIN.

**Most Fodders are deficient in mineral matter——
BONE MEAL will provide the necessary mineral matter.**

COCKBILL'S BONE MEAL is manufactured from clean, fresh bones, steamed and sterilized at a high temperature and pressure, and finely ground to ensure easy digestion. **Price, 16s. per cwt.**

Sample on request to **J. COCKBILL,** 407 POST OFFICE PLACE, MELBOURNE.

Australian "ESA" Bluestone

APPROXIMATE ANALYSIS 99·15% COPPER SULPHATE.

FOR SPRAYING, PICKLING, BATTERY PURPOSES, ETC.

If your Storekeeper has no Stocks, Send your Inquiries to:—

ELDER, SMITH & CO., LIMITED, SOLE AGENTS

ADELAIDE: 27-31 Currie Street.
MELBOURNE: 95-97 William Street.
SYDNEY: 4 Bridge Street.
BRISBANE: 334-338 Queen Street.
PERTH: St. George's Terrace.

—— WRITE FOR DESCRIPTIVE PAMPHLET ——

The PRACTICAL INFORMATION

that this little book contains will prove helpful to any one who gets a living from the soil. Entitled "Productive Fertilizers," it stresses the great importance of complete fertilizers, giving prominence to

Sulphate of Ammonia

as the most economical source of the supply of nitrogen that can be obtained in Australia

It shows, in brief, the advantage of using a nitrogenous element that is purely Australian

WRITE TO-DAY FOR YOUR COPY TO

THE METROPOLITAN GAS CO.

196 FLINDERS STREET —— MELBOURNE

NATIONAL TRUSTEES

Executors & Agency Company of Australasia Ltd.

DIRECTORS:

EDWARD FITZGERALD, Esq., LL.D., Chairman.
HENRY MADDEN, Esq. Senator Brigadier-General H. E. ELLIOTT, C.B., C.M.G., D.S.O., D.C.M.
JOHN I. WINTER-IRVING, Esq. CHAS. R. MURPHY, Esq.
JOHN SYLVESTER FEEHAN, Esq.

This Company Acts as Executor or Joint Executor of Wills, Administrator, Trustee of Settlements, and Agent for Absentees under Power of Attorney.

MONEY TO LEND ON BROAD ACRES AND FARM LANDS

Offices—**113 Queen St.** (Corner of Little Collins-st.), **Melbourne**

CHARLES CROMIE, Manager.

is a simple arrangement that multiplies the power at the handle 260 times—handy to use, easy to move, quickly rigged, and works in roughest country. Standard equipment pulls trees and stumps from 1½ acres without changing anchor. Many other time and labour saving features. Catalogue with pleasure.

TREWHELLA BROS. Pty. Ltd., TRENTHAM

Registered Trade Mark

Works—
CURDIE'S RIVER

Telephone—Central 2807

"BULLDOG" Unburnt (Ground Carbonate) Agricultural Lime

For Orchards, Crops, and Pastures

Its use is strongly recommended by all experts, and those who have had practical experience. Any quantity supplied at shortest notice.

For applying to land we recommend our "Ajax" Lime Spreader

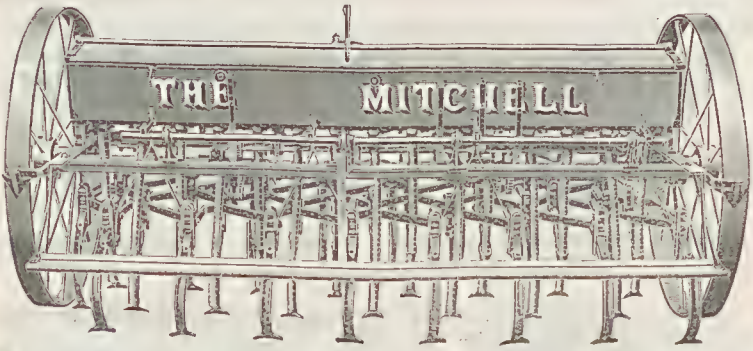
Have you seen our Reinforced Cement Cattle and Pig Troughs?

Rates and full particulars from Distributors—

T. CURPHEY Pty. Ltd. 225 Coppin St. Richmond, Victoria

PUMPS (For every Purpose—Hand or Power)
TOOLS (For all Trades)
WOODWORKING MACHINERY, Etc.

McPherson's Proprietary Limited
582-592 Collins St. **Melbourne**



Mitchell Patent Stump-Jump Rigid-Tyne Combine is Superior to a Spring-Tyne

Because all the tynes being rigid, work ALL the ground to the full depth, whereas a spring-tyne does not. Many users of the Mitchell Patent Tyne say that twice over with it is as good as three times with a spring-tyne. In stiff land the Mitchell Patent Tyne makes a far superior job to the spring-tyne. While jumping, the tension on the Mitchell Patent Tyne decreases as it rises, whereas with a spring-tyne it increases. The Patent Tyne is much easier on the horses. See one before you buy. (Spring-tynes supplied if desired.)

Everything for Farm, Orchard, Dairy, Road, Sheep

WRITE. *PLEASE MENTION THIS ADVT.* *EASY TERMS IF WANTED.*

MITCHELL & Co. Pty. Ltd.

Head Office: W. Footscray. Showroom: 596 Bourke St., Melbourne.
New South Wales Head-quarters: Parkes.

IN DRY WEATHER YOUR STOCK NEED **Molasses** LARGE BARRELS (about 6 cwt.) 50/-

Try our "**MOLLERNE**"

The Ideal Fodder for all Stock

A TRIAL TON AT £8 WILL WORK WONDERS

Write for Particulars and Samples at once—

QUEENSLAND MOLASSES CO. 363 FLINDERS STREET — *'Phone 4528* — **MELBOURNE**

BRUNNING BEST FOR BEARING **FRUIT TREES**

(True to Name and Healthy)

ARE PLANTED THROUGHOUT AUSTRALASIA

Shipments made to all Parts of the World

JOHN BRUNNING & SONS *Established 60 Years*

SOMERVILLE NURSERIES, SOMERVILLE, VICTORIA — AUSTRALIA

Profit by Dry Pickling

WITH

"ANTI-BUNT"

(Finely Powdered Copper Carbonate 95/100% Purity)

For the Treatment of Wheat to Prevent Bunt or Smut.

1½ ozs. of ANTI-BUNT will treat 1 bushel of seed grain

Complies with the Standard as recommended by the University of California and Departments of Agriculture.

ANALYSIS GUARANTEED

Copper as Cu 51/54%, Copper Carbonate and Copper Hydrate not less than 90% of a mixture of the two.

FINENESS GUARANTEED

ANTI-BUNT will pass through a 200 mesh sieve.

Kegs containing 56 lbs.	.. ..	1s. 8d. per lb.	Net F.O.R. Melbourne
Cases ,, 2 x 20 lb. tins	..	1s. 9d. ,, ,,	
Cases ,, 4 x 10 lb. tins	..	1s. 10d. ,, ,,	
Cases ,, 8 x 5 lb. tins	...	2s. ,, ,,	

Samples and Supplies forwarded on Application to the Manufacturers—

A. VICTOR LEGGO & CO.

Melbourne: 497 Collins Street

Sydney: 9 Phillip Street

Brisbane: Market Street

New Zealand Loan & Mercantile Agency Co. Ltd.

COLLINS STREET, MELBOURNE

LIBERAL CASH ADVANCES

WOOL, GRAIN, SKINS, HIDES, TALLOW, BARK, STOCK AND STATION AGENTS ON COMMISSION ONLY

LOCAL SALES AND SHIPMENTS OF BUTTER UNDERTAKEN ON OWNER'S ACCOUNT

Agents for

PAGE'S WIRE STRAINERS IRONSIDE WIRE CUTTERS
BAILEY'S ANTI-MAMMITIS LOTION
FATERINE, A NATURAL CALF AND PIG FOOD

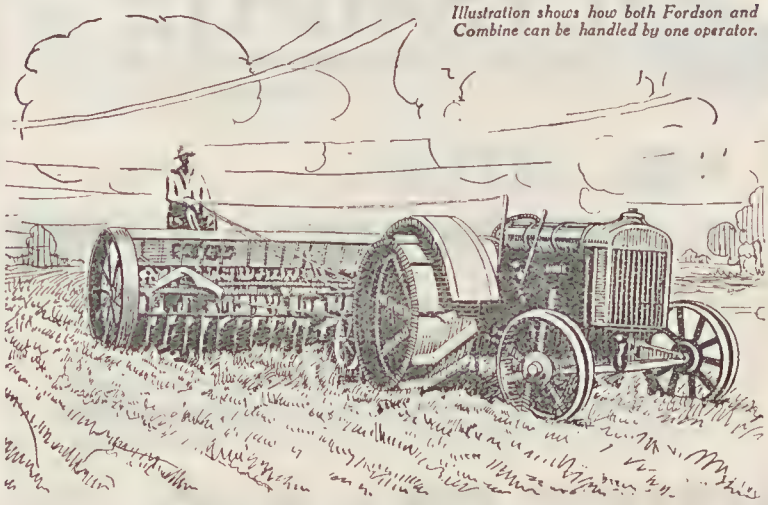
COOPER'S SHEEP DIP

COOPER'S MILK OIL FLUID
WEEDICIDE MEDICO
COOPER'S WORM TABLETS
COOPER'S LAVENE

SALES OF SHEEP & CATTLE

Held Weekly at Newmarket

Illustration shows how both Fordson and Combine can be handled by one operator.



Saves hours of the farmer's day

SEEDING days are often hurried when weather conditons are not just ideal. Use of Fordson power to pull the Combine Drill makes it possible to complete the entire work of seed bed preparation and seeding with uniform ease and efficiency.

Mr. A. W. Major, of Iraak, via Carwarp, Victoria, states his Fordson worked 33-tyne 16-row 9½-ft. combine drill and cultivator, covering 22 acres in a day, the fuel consumption averaging ⅔ gallon per acre. With every farm implement, Mr. Major proved the Fordson both speedy and economical.

Fordson speed and power actually add hours to the farmer's day at those times when he needs them most, not only in seeding, but in every other farm operation. A Fordson will work 24 hours on end without tiring, and generate its own lighting power for working at night.

Your nearest Ford Dealer will gladly demonstrate Ford Products on your own property—without obligation to you.

Fordson
The Universal Tractor
£180 *Complete with Fenders and Pulley. F. O. B. Ford Works in this State.*

Ford
One-Ton Truck
Complete with Standard Body. F. O. B. Ford Works in this State .. **£160**

FORD MOTOR COMPANY OF AUSTRALIA PTY. LTD.
Branches in all States

AUSTRALIAN MADE WIRE NETTING
PROOF
SYDNEY. N.S.W.
TRADE MARK

LYSAGHT'S

Australian Made

QUALITY GUARANTEED

WIRE NETTING

FENCING WIRE and other WIRE

ZINC OXIDE

Obtainable from all the Leading Merchants and Storekeepers

LYSAGHT BROS. & CO. LTD.

Manufacturers ——— SYDNEY

Victorian Agents—Gibbs, Bright & Co., 34 Queen St., Melbourne

CHAFFCUTTERS

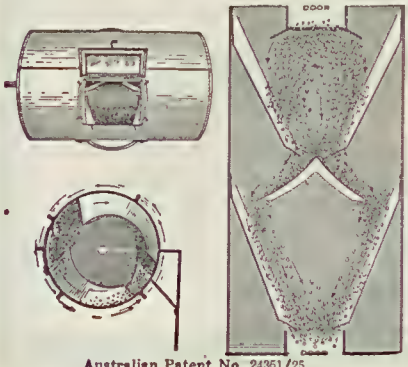
STATIONARY AND TRAVELLING

Travelling.—Single-screw Bagger Machine, frame of selected Tasmanian blackwood, brass bearings, steel gear, special steel cheeks and mouth plates, latest patent quick change knives, sector cheeks, screw bagger with ball bearings, patent knife-wheel with six knives, fitted with Buncle special belting, mounted on substantial transport. **£92/10/-.** Terms if required, at slight increase in price.

No. 2B Stationary.—Our popular High-grade 3-Knife Cutter, excellent in design, and of superior finish throughout. Blackwood frame, brass bearings, steel cheek plates, steel mouth plate, and steel gears. A machine that has given satisfaction to thousands of farmers. **£7/4/- down,** balance to suit you.

JOHN BUNCLE and SON Pty. Ltd.

19-21 Wreckyn Street, North Melbourne



Australian Patent No. 24361/25.

The "Hudson" Patent Dry Wheat Pickler

Capacity 8 to 10 Bags per Hour.

THE "Hudson" Patent Dry Wheat Pickler is the simplest wheat pickler yet invented. It has no mechanical parts to get out of order, is thoroughly dust proof in operation, easily worked, effectively and economically dusts the wheat in the uniform way.

Price £4/15/-, complete with Brackets

Hudson's Stores, 230 King St., Melb.

PICKLING WHEAT

WITH

"SICKLE" BRAND FORMALIN

is recommended for sowing when the soil is moist

Growers, however, should be careful to insist on the original

"SICKLE" BRAND FORMALIN

proved for nearly twenty years, and
refuse imitations that are on the market

Genuine "SICKLE" Brand too, is ridiculously low in price, costing only one-halfpenny for each bushel (or acre) sown. Is it not reasonable therefore that wheat-growers should always insist on "SICKLE" Brand Formalin, which is, moreover, the only Formalin manufactured in Australia

Ask local agents or write for literature to—

CUMING, SMITH & COY. PTY. LTD.

Head Office: 65 William Street, Melbourne. (G.P.O. Box 390)

PARSONS BROS. & CO.

Propy. Ltd.

OATMEAL, SPLIT PEAS, and
PEARL BARLEY MILLERS
and "CORNINA" MANUFACTURERS

ARE

BUYERS of OATS, PEAS, BARLEY, and MAIZE.

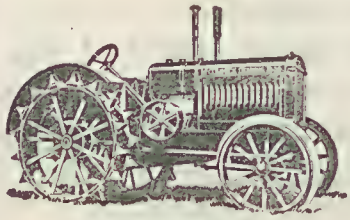
SEND SAMPLES OF YOUR GRAIN TO US.

BOX 2514.
G.P.O., MELBOURNE.

"Good equipment makes a good farmer better"

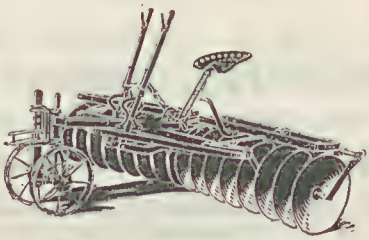
McCORMICK-DEERING FARM MACHINES

THE high standard of constructional efficiency embodied in McCormick-Deering Farm Machines is the result of nearly one hundred year's experience and a close association with farming problems in all parts of the world. That is why McCormick-Deering Farm Machines can be relied upon in all conditions. Whatever kind of farming you are engaged in—whatever part of the country—you will obtain the best results by standardizing on McCormick-Deering Farm Machines.



TRACTORS

McCormick-Deering Tractors are furnished in 10-20 and 15-30 sizes. Fitted with removable cylinders, ball and roller bearings at 28 points, one-piece main frame, belt pulley, throttle governor, automatic oiling system, high tension magneto, platform, mud-guards, &c. Specially equipped tractors for orchard work, also special types for commercial, industrial and municipal service.

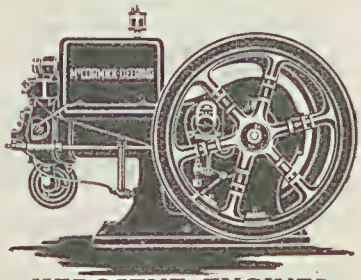


HARROWS

The McCormick-Deering line includes disc harrows, spring-tooth harrows and peg-tooth harrows in horse and tractor styles. Special types for orchard work, cotton and sugar plantation, &c.

PLOWS

Single or multi-furrow. Disc or mouldboard. Stump-jump or set. Whatever size or type of farm, orchard or vineyard plow you require, you will find it in the McCormick-Deering line. Special types for tractor work.



KEROSENE ENGINES

The McCormick-Deering Engine will deliver sturdy, dependable power for all your jobs at minimum cost. Made in 1½, 3, 6, and 10 H.P. sizes. Fitted with removable cylinder, gravity-feed mixer, built-in magneto, throttle governor, &c.

International Harvester Company of Australia Pty. Ltd.

278-294 Roma Street BRISBANE 229-231 Castlereagh Street SYDNEY 543-555 Bourke Street MELBOURNE 113-114 North Terrace ADELAIDE

RICHARD PURSER & CO., BASSENDEAN, AGENTS FOR W.A

THE JOURNAL

OF THE

Department of Agriculture

OF

VICTORIA.

Vol. XXV. May, 1927. Part 5.

PLANT PATHOLOGY.

STUDIES IN EUROPE AND AMERICA.*

(Continued from page 238.)

By D. B. Adam, B.Ag.Sc., Plant Pathologist.

(4) Cool Storage and Related Problems in England and America.

Australia, by reason of her distance from overseas markets, is vitally interested in cool storage, and the solution of its problems must necessarily precede the building up of any extensive trade in her perishable products.

The problems of cool storage of fruit in transit fall into two main groups. One group consists of those associated with the design of the ships' holds, the refrigerating apparatus, the regulation of temperatures, stowage, and so forth; these, though very important, will not be discussed here. The second group of problems concerns the fruit itself: what factors determine its deterioration, and the steps necessary to ensure its maintenance in a sound state as long as is desired by the exigencies of trade.

In few activities is a scientific viewpoint likely to prove more useful than in the field of cool storage.

The storeman classes all his fruit as either sound or wasty, irrespective of the fact that wastiness may be due to scald, natural breakdown, Jonathan spot, or to some of the many fungi which produce rots and moulds in fruit held in cool storage. Scientific effort endeavours to attack these problems in their simplest aspects, and to determine what it is that limits storage life. It may, on the one hand, be due to some condition inherent in the fruit, to its state of maturity when gathered, or to some obscure fact in its orchard life history, or perhaps to such external conditions as temperature and humidity in the cool store.

For the investigation of these problems there are two methods of approach, which may be illustrated by a simple example. A cool store operator knows in a general way that fruit from some districts keeps better than that from other districts; there is less waste at the end of a

* Report on investigational work in England, Europe, and United States of America. Previous portions of Mr. Adam's report were printed in this JOURNAL for January, February and April.

definite storage period. Such differences, however, may not show every year, and for that reason his operations are, to an extent, a gamble. The matter is taken in hand by an investigator, who, by a series of carefully planned field experiments, followed with storage trials, comes to the conclusion—quite rightly, let us say—that the difference noticed in some years is due to an excess of rain in the area where the poorer-keeping apples were grown. Such information undoubtedly would be of great value.

A second investigator attacks the problem from another angle. He recognizes that the varying orchard conditions must affect the composition of the apples that they produce, and that for this reason the fruits probably differ in their intrinsic qualities—a difference which he hopes to relate to their difference in keeping quality. As a matter of fact, he may discover that apples of a certain chemical composition never store well; whether they are produced in an excessively moist district, on very rich land, or on young trees, they all have this unfavorable composition, and for that reason do not keep well.

This method is more fundamental than the first, and ultimately, since it permits wide generalizations, it must be more useful. Against this, however, must be set the fact that it is much slower in producing results. In involves a great deal of patient detailed laboratory work; it leads to many disappointments, and even when any definite discoveries are made, they may not seem immediately to be of practicable application.

The first—to date the method that has given the more results of practical value—is in a general way the American method; the second perhaps rather describes English methods best.

The most important centre of cool storage research in England is the low temperature station at Cambridge. At this station both storage trials and laboratory investigations into the more fundamental aspects of the problem are being carried out. Storage trials have, for the most part, been conducted with applies. They indicate that there is an enormous difference in the keeping quality of apples from different soils, that varieties vary in their reaction to the temperature of storage, and that the lowest temperature of storage, avoiding freezing, is not necessarily the optimum for storage. If such apples are stored below such an optimum temperature, they deteriorate as a result of internal breakdown.

A novel method of storage is being developed from the discovery that a reduction of the amount of oxygen normally present, and an increase in the amount of carbon-dioxide, retards the ripening of fruit; hence, prolongs the period in which it may be held in sound condition. The composition of the air under these "gas storage" conditions is regulated by ventilation.

The question of wrappers has been the subject of study, and so far oiled wrappers, developed by Dr. Chas. Brooks, in America, for the control of scald disease, have been the only wrappers of outstanding merit. Laboratory research has attacked the problem of what are the important things in the constitution of an apple making it a long or short keeper, or rendering it liable to disease, moulds, rots, &c. Most of this work has centered round the respiratory activity of fruit and to studies on the change of chemical composition throughout its life history at varying storage temperatures. This work has been amplified to include fruit from trees of different ages, from different localities.

from different stocks; and, as a result, a rough idea has been gained of the qualities associated with long keeping and disease resistance.

Several institutions are associated in these laboratory investigations, notably the Imperial College of Science, at South Kensington, where special attention is given to the chemical composition of apples, and there some progress is being made in associating long storage with a particular composition.

It is impossible to traverse the entire field of American endeavour in fruit cool storage. It is only practicable to describe a few phases of work which the writer met with, and which seem worth recounting here.

The Estimation of the Correct Time for Picking Fruit.

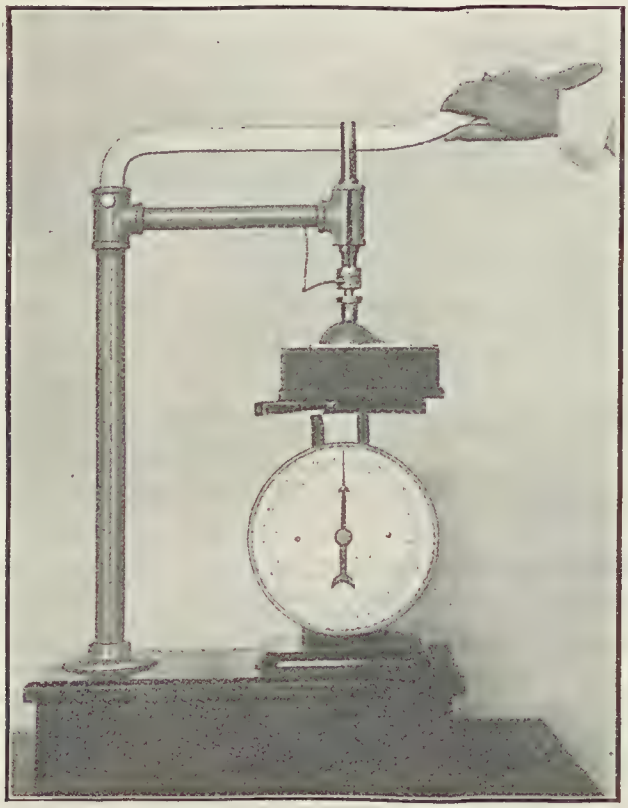
The estimation of the correct time to pick fruit, especially pears. Every one associated with fruit-growing realizes that the correct time to pick fruit, whether for immediate consumption, the cannery, or for the cool store, is hard to determine, and still harder to describe to any one else. The determination of this point is important to all concerned; the canning pear-grower, for good reasons, does not want to pick fruit before it has attained the maximum size without risk of loss during the processes leading ultimately to the can, nor does the grower for cool storage wish to leave his fruit on the tree so long that it quickly deteriorates in cool store. At present, experienced growers attain a certain amount of success by simply examining the colour of the fruit, but this index is not always suitable, nor is it reliable or fit for general use, since consistent appreciation of the fine differences of colour shown by fruit ripening from day to day is virtually impossible.

The Oregon Experiment Station, recognizing the necessity for some machine independent of the human element, has developed the "pressure tester." This machine is designed so that pressure is applied on the surface of the fruit to be tested in much the same way, and for the same reason, as one would press his thumb on a pear to test its ripeness. This pressure, applied in a standardized way by a plunger, can be fairly accurately measured. Experiments in recent years, using this instrument on representative samples of fruit that have either been consumed immediately, sent to a cannery, to the eastern States, or to a local cool store, have shown that best results gained with fruit so destined are to be obtained from that showing a certain test; perhaps with a particular instrument it would be 26 lb. for fruit intended for sale locally, and 30 lb. if it is to be sent to the eastern States.

There is no doubt about the possible usefulness of this instrument. The writer was at Medford, in the Rogue River Valley, a famous pear section in southern Oregon, about the time when the Williams pears were due to be picked for shipping to eastern States. Each two or three days growers brought into the county adviser's office, where a pressure tester was installed, four or five pears to be tested, on the result of which they based their time of picking. Although each grower brought such a small sample, and the complete test took only a couple of minutes, one person's time was taken up continuously testing pears, so great was the demand and confidence of growers.

A second example of the value of the use of the pressure tester was afforded by a grower of canning pears in the Willamette Valley, Oregon, whose very extensive orchard the writer visited. At the time of the 1925 pear harvest, the grower received a call from a cannery

representative, who, as a result of examination, advised the grower to pick his pears immediately, since they were ready. The orchardist consulted the Oregon Agricultural College authorities, who, making use of the pressure tester, advised waiting for a few days. Tests were made daily, the fruit ultimately being picked ten days later. Calculations made showed that during the interval between the time when picking was first recommended and the time the pears were ultimately picked gave an increase of 20.3 per cent. in size!



A "Pressure Tester".

The scope of the use of this instrument is being extended to apples, plums, and other fruits, but so far its most successful application has been with pears. Whilst it is undoubted that it has value for testing pears for maturity, its limitation must be borne in mind. The principle involved in its use does not run counter to our present ideas of what happens when fruit ripens, but we know that fruit varies a great deal in maturity from tree to tree, and even on the same tree; that ripening is a complex process very incompletely known, so that any maturity testing instrument devised in the way that the present tester has been must be carefully standardized, carefully applied, and the results interpreted by a person who has had considerable experience in its use.

Storage of Berries.

The Puget Sound district of Washington State, especially the Puyallup Valley, grows very large quantities of small fruits, particularly raspberries. The problem of marketing this fruit, only a small portion of which can be consumed in the fresh state, has been solved by canning and by special methods of storage. One method, which the writer saw in actual use on a raspberry plantation at Puyallup, is followed with fruit over-ripe, or too crushed for canning purposes. These berries are packed, 2 parts to 1 part of sugar, in 4-ft. barrels, and stored at 15 degrees. Fahr. till thoroughly frozen. Rapid freezing is desirable. They can then be held practically indefinitely in cool storage. Berries so treated and stored are used extensively for pies, short cakes, ice cream, soda fountains, &c. The colour and the manner in which the flavour is retained in fruit to which sugar has been added is much superior to the unsweetened stored product, and quite equal to fresh fruit for the purposes for which it is used.

There can be no doubt about the value of a process which permits the small fruit-grower to hold for a reasonable price a product which, from its perishable nature, he otherwise is forced to sell at a time when his and all other growers' stuff is being sold.

Storage of Lemons.

Large quantities of lemons are grown in California. In view of our interests in this fruit, a brief account of the methods of storing—an integral part of the marketing arrangements—may be given here.

The lemons are brought to the packing house loose. Being picked for size, they vary in colour. They are first emptied into a tandem washer. The washing water is a solution of borax, to which at the beginning of the season soap is added, and is heated to about 120 degrees F. to remove smudge marks on the fruit.

After washing, the lemons pass over an endless belt from where, without being dried, they are packed strictly to colour, into lemon cases, and removed to a natural store, generally the cellar of the packing house.

This store is constructed in such a way that the sides and top can be thrown practically wholly open at night after a certain degree of coolness has been reached. The walls and roof of the store may be double to secure a degree of insulation. The humidity in the store must be kept up to prevent wilting; its maintenance is assisted by having outside sprays through which the cool evening air passes on its way into the shed. These sprays, in addition, may be used during sunny days to cut down the heat striking the store. Lemons kept under these conditions may be quite easily stored for three or four months.

Having been stored according to colour, the removal of fruit in its best condition according to the demand is facilitated. When required it is elevated to the packing house and repacked from an endless belt, grading being effected by eye.

In autumn and winter, when well yellowed lemons are difficult to obtain, colouring of the fruit is resorted to. For this purpose a double walled dark room, capable of holding about 600 cases of fruit, heated to about 70 degrees F., with hot water pipes and fairly gastight, is used. Ethylene gas is conducted into the room at the rate of one-half cubic foot every three hours. The process takes about three days. It is important to realize, however, that this conditioning takes place only when the market is bare of well coloured fruit.

(To be continued.)

FEEDING FOR MILK PRODUCTION.

By R. T. Archer, Chief Dairy Inspector.

Dairy farmers should always remember that a cow can produce milk only from the food she eats. The capacity to produce milk is a transmissible characteristic, and the cow that has inherited the quality in a high degree will give a good return for all the food she can be persuaded to eat. Moreover, the greater the quantity and the higher the quality of that milk, the more feed she will have to eat in order to produce it. Further, it must be remembered that a cow also requires food for her body maintenance. Her temperature must be kept at from 101 deg. to 102 deg. Fahrenheit. This is done by the combustion, or burning, or oxidation in the system of certain constituents of the food. If her temperature varies one way or the other, it is an indication that there is something wrong with her health.

When a cow drinks a large quantity of cold water, it is almost immediately raised to body temperature by the combustion of food constituents. It is the same with the air inhaled. In cold weather this may be 40 deg. Fahrenheit, or even 30 deg., but in the lungs it is immediately heated by the combustion of similar food constituents.

Again, as she moves about, there is a tremendous expenditure of energy which must be supplied from the same source. For instance, while grazing, the cow has to walk here and there to gather her food; then she has to masticate and digest it. In addition, the work required of the heart in circulating the blood is enormous.

All this heat or energy is provided by the combustion of the fuel in the food, which is known as carbohydrates, and is found in the food in the form of sugar, starch, and fat or oil.

Another most important provision is for the repair of the waste of tissue which is continually in process. This waste is all supplied by another constituent of the food called protein. The whole of the animal body is built up out of the protein that she eats. Now, while the carbohydrates consist of carbon and water, the chief constituent of protein is nitrogen, with the addition of carbon and water and small amounts of sulphur, phosphorus, lime, iron, and other mineral ingredients. So the continual waste of tissue, i.e., hair, skin, horn, hoof, flesh, &c., that is going on, has to be repaired from the protein which the cow eats. To put this clearly, the system has to be maintained in health so that the animal may perform her appointed work, which is the production of milk.

Balancing the Ration.

In addition to the food provided for maintenance, we must supply a cow with food in quantity and quality according to the milk she produces. Grass is the natural food for cows. Though the high producing animal is not a natural product, a mixture of grass and clovers contains a balanced ration and sufficient of the food constituents for an average cow of average milk production, say, 3 gallons of milk, testing 4 per cent. of buttter fat.

A balanced ration is food which contains the different food constituents in proportions of which the cow can make use without any going to waste. Average grass and clover contain about 75 per cent. water and 25 per cent. dry matter. The dry matter, of course, is the food.

The quantity of food per day required by a cow in full milk is about one-tenth of her body weight, that is, a cow 1,000 lb. live weight requires daily 100 lb. of grass and clover or its equivalent in other food. When the clovers are in bloom and the grass is young they make practically a balanced ration, containing about 75 per cent. water and 25 per cent. dry matter.

The dry matter consists of 10 lb. of indigestible fibre and 15 lb. of digestible or soluble parts; the latter are dissolved by the digestive juices secreted by the glands and cells of the stomach. These dissolved food juices are absorbed into the blood stream and conveyed to the different parts of the body, to be extracted therefrom by the cells for their nourishment and reproduction.

The soluble part of the grass and clover consists of 12 lb. of carbohydrates, 2½ lb. of protein, and ½ lb. of fat. This represents a balanced ration. The carbohydrates are heat- or energy-producing foods. Fat or oil is used for the same purpose, but for the production of heat 1 lb. of fat is equal to 2½ lb. of sugar or starch, and may be looked upon as an emergency provision, in that if a cow is subjected to a sudden chill or drop in temperature, as when she takes a drink of cold water, the fat of the food is available to quickly counteract the effect.

In the production of milk, protein is the most important constituent of the food, and at the same time the most expensive to provide, and while protein contains the ingredients (sugar or starch) for heat production, it we feed a ration too high in protein and too low in carbohydrates, the cow will use the carbohydrates of the protein, but the nitrogen and mineral constituents will pass off unassimilated.

Besides being a wasteful method of feeding, this has a detrimental effect on the health, for on the kidneys is thrown the additional work of ridding the system of the excess nitrogen.

Now let us consider some of the foods available. Lucerne is looked upon generally as the "king of fodders." One hundred pounds of green lucerne contains on an average of 3.7, or 3¾ lb., protein, or 1¼ lb. more than the average cow can make use of; but average lucerne contains only 7⅛ lb. of sugar or starch, so a cow would have to eat 140 lb. of green lucerne to obtain the required amount of carbohydrates. This would increase the loss of protein to 2¾ lb.—a loss that cannot be afforded in the production of milk.

Then take another extreme in one of the most valuable fodders grown, i.e., maize. This is the best of all fodders for making into ensilage because of its solid stem, and because it will grow the greatest weight per acre of any forage crop—anywhere from 15 to 60 tons per acre, according to soil and conditions—but a cow cannot produce anything like the quantity of milk she is capable of producing if fed on maize alone, for it contains only about 1 per cent. of protein, and she will have to eat 250 lb. of green maize to procure the 2½ lb. of protein required. However, 100 lb. of green maize contains about the right

amount of carbohydrates. Consequently, if 250 lb. of green maize were eaten, 17½ lb. of carbohydrates would go to waste.

However, we have seen that a cow's requirement is about one-tenth of her body weight; thus, an average cow, 1,000 lb. live weight, cannot eat much more than 100 lb. in a day, and therefore cannot eat sufficient green maize to enable her to obtain the required 2½lb. of protein.

Thus we frequently hear maize condemned as a fodder, because of the diminished yield of milk from cows fed all the maize they can eat. The cause and remedy are evident. If some food rich in protein be fed with the maize, the result will be found satisfactory. Thus, if lucerne and maize be fed together, the deficiency of protein in the maize is made up in the lucerne, and the deficiency of the carbohydrates in the lucerne is balanced by the excess in the maize. All legumes, that is, clovers, peas, beans, tares, &c., are rich in protein. Grasses are generally deficient in protein. That is why we must grow clovers in the pastures to balance the ration. An absence of clovers in the pastures indicates that there is a deficiency of phosphoric acid in the soil; top-dressing with phosphatic manures will supply the defect.

While grasses are generally lacking in protein, we find that those grown in certain soils are very rich in this constituent, especially where the land has been top-dressed.

Again, the stage of growth is all important. When the grass is young and short it is almost invariably much richer in protein than when it matures. Therefore, the grazing should be so arranged that the grass does not get away from the stock. If the paddocks are subdivided they can be grazed in rotation, and in a season of plenty some of them could be cut for hay. Better results will be obtained by keeping the grass grazed down so long as the cows can get a feed in a reasonable time and then lie down in the shade to digest it.

The same applies to Japanese millet. This should be grazed off when about 6 inches high. If allowed to shoot into ear, the best results will not be obtained.

Nearly all the food can be grown on the farm, millet for summer grazing when the pastures are dried off, and Algerian oats for the winter when the paddocks are lying dormant.

Subterranean clover, however, will provide good winter food. Maize, contrary to most forage crops, is not at its best until almost mature, that is, when the grain is just in that condition that it can be dented with the thumb-nail. This is an additional reason why it is so good for ensilage.

The physiology of the production of milk would take too long to discuss fully. However, it is essential to mention that the process consists of building up the cell system of the udder, and this can only be done out of the protein that the animal eats. Consequently, protein is the all-important constituent of the food for milk production. While grass generally contains sufficient protein for the average cow, in the case of cows producing 4, 5, 6, or up to 10 gallons of milk daily, they cannot get sufficient protein from grass alone. Then we find that concentrates, in the form of crushed oats, bran, oil cake, or some of the many forms available, must be fed. Sometimes 2 or 3 lb. daily

makes all the difference. This is all fully discussed in Bulletin 52, available free on application to the Department of Agriculture.

A general rule is to feed, say, 1 lb. of concentrates for every 2½ lb. of rich milk from Jersey or Guernsey cows testing 5 per cent. of fat or over; 1 lb. of concentrates for every 3 lb. of 4 per cent. milk from Ayrshire or Shorthorn cows, and 1 lb. of concentrates for every 4½ to 5 lb. of milk testing 3 to 3.5 per cent. butterfat.

This is where the scales and the Babcock tester are a great help, for besides enabling us to see exactly the yield of each cow, they will indicate which members of a herd require richer food than the grass they are getting.

An Ample Supply of Good Water Essential.

Water is of as great importance as food. Milk contains on an average 87 per cent. water, and it has been found that water must always be available and easy of access, so that the cow will go and have a drink whenever she feels inclined. If she has to travel far for it, or it is difficult to get at, she will not drink until driven by excessive thirst. This means a reduction of yield and a loss of profit. Cows in milk require water according to the quantity of milk they are giving. They should be allowed four times the amount necessary for dry cows. The ordinary milking cow should have from 10 to 12 gallons of water per day. A Friesian cow giving 10 gallons of milk daily would drink 20 to 30 gallons of water daily.

In many districts troughs filled by windmills will be found most convenient. A running stream is very satisfactory when the approaches are made easy. If dams constitute the supply, they should be so fenced that the cows cannot get into the water to pollute it. This is best managed by the windmill pumping the water into a trough. If the water is not clean and palatable they will not drink suffiient for good results.

Mineral Matter.

Milk contains a considerable amount of mineral matter. Every 10-gallon can contains nearly 1 lb. This consists principally of phosphorus and lime—about ½ lb. While some foods contain sufficient mineral matter for a cow's requirements, many do not, especially for cows producing a large quantity of rich milk.

If foods do not contain sufficient mineral matter for the amount of milk produced, the cow will for a time draw the phosphate of lime from her own skeleton; then comes a breakdown in health. The mineral of which there is most commonly a deficiency is lime, and cows on the point of breaking down have immediately recovered when lime water has been provided for them to drink.

Salt is an absolute necessity if cattle are to be maintained in health. From 2 to 4 oz. daily per cow are required. Salt has been found very beneficial in the relief of udder troubles, and cows showing signs of mammitis have recovered when salt has been added to their food.

Recent investigations have shown that the addition of very small amounts of potassium iodide to the food has had amazing results in various ways beneficial to the health and reproduction. There is not

time to discuss this at length. Suffice it to say that potassium iodide is now included in the salt licks and mineral mixtures. It is advised by the Department of Agriculture that the following mixture should be provided for all the animals, pigs included, in boxes or troughs placed where the animals may have free access:—Salt, 40 lb.; bone flour, 20 lb.; sulphur, 15 lb.; air-slaked lime, 25 lb.; potassium iodide, 5 oz.

SEA LAKE FALLOW AND CROP COMPETITION.

Report by J. Brake, B.Ag.Sc., Senior Inspector of Agriculture.

With a yearly average rainfall of 12¾ inches, which is a little lower than that of the majority of Mallee towns, the district of Sea Lake finds that good fallowing and better farming methods are worth while.

Compared with other Mallee districts, the fallows were well prepared, whilst the crops showed promise of good yields, and were clean of disease, and of weeds, except perhaps barley.

One aspect of cropping which has apparently not been given sufficient attention is the maintenance of purity of seed. Many crops were thick with other varieties and with barley. The latter is rather difficult to separate out, and depreciates the quality of the wheat. For the farmer's own sake it is desirable that the variety sown should be true to type, with no strangers present. Careful buying and selection of seed enables this to be done without much trouble, whilst the introduction of seed from a breeding station from time to time will help considerably. A good plan is to obtain a few bags of first class seed wheat every year as a basis to build up subsequent requirements.

The rates of seeding and manuring in the crops inspected were very consistent, and average 71 lb. of seed and 88 lb. of superphosphate per acre, amounts which are shown by experimental plots to be about correct for the mid-Mallee.

Early sowing of the crop, say April-May, is advocated for the Mallee, and examination of the cropping details shows that, with the exception of two crops sown in April and two in June, the whole of the exhibits were drilled in during May.

Popular wheats in the district are Joffre, Currawa, Federation, Rajah, and Bald Early. The first two are good late mid-season Mallee wheats; Federation is not generally favoured in the Mallee, although good yields are often obtained from this variety in the southern Mallee, and at the Walpeup plots its average has been over seven bags for the last two years. Rajah and Bald Early, both quick-maturing early varieties, should be sown late and stripped early. Early varieties are often liable to shed their grain, so that they should not be left standing in the paddock after ripening. This year conditions have been very adverse to early varieties, as the strong winds, combined with the hot spring, caused a great loss of grain by shaking.

However, in other years some of the early varieties have yielded well, and this year's experience is an illustration of the fact that the varieties proved to be best will sometimes fail in one particular year. There is a

necessity for careful testing of any variety for a number of years before growing it extensively.

Other wheats worthy of mention for Sea Lake conditions are Sepoy, Rance, Free Gallipoli, and Yandilla King. The latter is a late wheat, and is often referred to an an "after-dinner" wheat, as it is somewhat tough to strip. Notwithstanding this, however, it is widely grown, and has a good record in regard to yield in experimental plots.

Sepoy, Rance, and Free Gallipoli are productions of the Department of Agriculture which are showing themselves well suited to Mallee conditions.

Flag Smut and Takeall showed up to some extent in most of the crops. Both of these diseases can be carried by the soil, and the prevalence of either in any quantity should be taken as an indication that the soil requires better fallowing and a spell from wheat. The remedy for both diseases is to burn the stubble of the infected crop, grow oats after the wheat, fallow early, and maintain the paddock in a well-worked and clean condition throughout the year. If a paddock must be left out to grass in any year, an endeavour should be made to burn off the barley grass, &c., before fallowing again.

Awards—Fallow Sections.

Competitor.	Mulch.	Moisture.	Absence of Weeds.	Cultivation.	Total.
Maximum Points	**25**	**25**	**25**	**25**	**100**
BEST FALLOW—OPEN—MINIMUM 100 ACRES.					
A. E. King (No. 2) ..	24	23	22	23	92
G. E. McManus	23	22	23	23	91
R. H. Colliver (No. 2) ..	23	21	23	23	90
A. E. King (No. 1) ..	23	22	20	23	88
W. McManus (No. 2) ..	21	21	23	23	88
W. McManus (No. 1) ..	21	21	23	23	88
E. Brennan	23	22	21	22	88
T. Ryan	21	22	22	22	87
W. O. H. Barnetby ..	23	21	22	20	86
R. H. Colliver (No. 1) ..	22	21	20	22	85
R. H. Colliver (No. 3) ..	21	20	20	22	83
J. G. King (No. 1) ..	21	20	22	20	83
J. G. King (No. 2) ..	20	20	21	21	82
R. B. Metherall	20	22	20	20	82
BEST FALLOW—SOLDIERS ONLY—MINIMUM 100 ACRES.					
P. R. Bell	22	23	22	23	90
T. Ryan	21	22	22	22	87
H. Beckham	22	21	21	23	87
T. Mayman	21	23	21	19	84
L. C. H. McGregor ..	20	21	21	20	82

Mr. A. E. King was awarded first place with his No. 2 fallow, which showed thorough preparation. There was a high wind blowing on the day of judging, but practically no drift was occurring from this paddock, apparently because the surface was well ridged, the last working having

been performed in north and south direction with a spring-toothed cultivator.

The field was Wimmera scarified 2 inches deep at the end of February, ploughed end of June to 2¼ inches with an eight-furrow mouldboard. It was then spring-toothed and harrowed early in July, in August, and September, and the last working was a spring-toothing in October. As far as possible all workings were done after rain.

There was a very nice shallow mulch, fine beneath and rubbly on the surface, a large supply of moisture beneath a good seed bed, and practically no weeds.

The fallow of Mr. G. E. McManus took second place. It was also summer fallow, having been spring-toothed 2 inches deep in February, ploughed 3 inches deep with the mouldboard plough early in June, then harrowed. It was spring-toothed in July, and lightly harrowed, and again twice spring-toothed in September and early October—all workings being carried out after rain.

Mr. P. R. Bell won the Soldiers' Section with a summer fallow which had been scarified 2 inches deep in March and then sheeped. In late July it was scarified, then scarified and harrowed in each of August and September, followed by two harrowings in October.

The result was a rather attractive-looking fallow, with very good moisture stored up. The mulch generally was good, although there had been a certain amount of drift. The paddock was clear of weeds, and the seed-bed was good.

Awards—Crop Sections.

Competitor.	Yield.	Purity and Trueness to Type	Absence of Weeds.	Absence of Disease.	Evenness.	Total.
Maximum points ..	**35**	**20**	**15**	**15**	**15**	**100**
BEST CROP—OPEN—MINIMUM 100 ACRES.						
T. Ryan	35	18	14	14	12	93
W. McManus (No. 1)	33	17	12	14	14	90
A. E. King (No. 2) ..	29	15	13	14	14	85
R. B. Metherall ..	27	19	13	13	12	84
A. E. King (No. 1) ..	27	16	13	13	14	83
W. McManus (No. 2)	25	17	13	12	14	81
P. McInerney ..	25	17	13	13	13	81
W. McManus (No. 3)	25	16	12	13	14	80
A. McLellan ..	25	15	13	12	12	77
J. G. King (No. 1) ..	19	16	13	13	13	74
J. G. King (No. 2) ..	15	15	11	11	12	64
BEST CROP—SOLDIERS ONLY—MINIMUM 100 ACRES.						
T. Ryan	35	18	14	14	12	93
L. C. H. McGregor ..	32	19	14	13	13	91
P. Kellonde ..	29	17	13	14	15	88
N. McIntosh ..	27	17	13	13	14	84

Mr. T. Ryan won both the Soldiers' and the Open competitions with a very even, heavy crop of Joffre. It was sown on winter fallow in mid-May, and was twice harrowed after seeding. The crop was fairly pure and true to type, and free from weeds and diseases generally.

Mr. W. McManus was second in the open competition with Federation, sown at 75 lb. per acre, with 75 lb. of super. There was some barley and a little flag smut present, otherwise the crop was uniformly good. This crop indicated the severity of the year's ripening period, in that, although Federation very rarely shakes, it was commencing to lose quite a lot of the grain.

In the Soldiers' Section for best crop Mr. L. C. H. McGregor took second place with a crop of Federation, very pure and true to type. It was grown on summer fallow, scarified 2½ inches deep in February, in June, and July. It was then harrowed, spring-toothed, and harrowed again in October. After a further stroke with the spring-tooth in April, it was sown with the combine in May with 75 lb. of seed, pickled with formalin, and 100 lb. of super. per acre.

Every assistance was given during the judging by the secretary and several other gentlemen, to whom I take this opportunity of tendering my thanks.

NORTH-EASTERN MALLEE FALLOW COMPETITIONS.

Report of the Judge, R. G. Thomas, M.Ag.Sc., Inspector of Agriculture.

The methods of competitors in the fallow competitions conducted by the various branches of the North-Eastern Mallee Better Farming Association were, in common with those of other wheat-growers throughout the State, subjected to a very severe test by reason of the unfavorable climatic conditions prevailing throughout the summer. Apart from an isolated thunderstorm in December, no appreciable rain fell on the fallows after September, and the maintenance of an effective mulch was rendered difficult on account of the prevalence of severe wind storms.

Over the whole of the Mallee the question of arresting the drift from fallow land under such conditions was one that last year received considerable thought from farmers. Whilst there seems little hope of preventing drift, there is no doubt that it can be minimized or increased according to the treatment given the soil. Land that is worked north and south after the last spring rains, and left ridged rather than flat, will not drift to any extent until such time as the surface has been smoothed out by the action of the wind. It is generally recognized, too, that land which has been allowed to dry out without working after rain will drift readily, and that land worked dry will, by reason of the powdery tilth usually produced, also tend to drift.

In the face of these seasonal difficulties, superimposed on those difficulties necessarily associated with the cultivation of Mallee land in the relatively early stages of development, the standard of the fallows exhibited throughout the competitions was very satisfactory, and some particularly good work was seen. The farmers concerned are obviously seized of the importance of paying particular attention to the preparation of their fallow. In this, as in other matters, they have the advantage over earlier settlers of the experience gained by other Mallee

farmers. If the interest that has been shown in this phase of settlement is maintained, the methods of preparing land for crop should attain a very high level; under such conditions there must necessarily follow for the farmers an era of stable prosperity.

The importance of early fallowing and early, that is, winter, working of the fallow, is emphasized by a perusal of the methods adopted in the preparation of the leading exhibits in the various districts. In all cases the fallow had either been ploughed as "summer fallow," and cultivated again in the winter, or else ploughed in midwinter and followed immediately by a harrowing or cultivation. This was particularly necessary last season, as no opportunity occurred to bring the fallow into order by later workings, the spring rains being sufficient only to allow of light workings to maintain the mulch created immediately after ploughing.

The entry shown by Mr. A. Wells, Wemen, Lipparoo, and Moss Tank competition, deserves special mention. Mr. Wells was favoured in the class of land available for cultivation—pine and belar country thoroughly grubbed—but he had certainly made the most of his opportunities. The cultivation had been most thorough, of regular depth, straight, and the last working had been north and south. The ridges made by the cultivator were still in evidence, showing that little drift had occurred. The moisture content throughout the fallow was excellent, and the soil below the mulch was nicely firmed; in fact, it was a fallow with which little fault could be found.

It was noticeable throughout the competition that the quality of the work done by entrants did not necessarily improve in proportion to the age of settlement in the various districts and on the individual farms. In some cases, no doubt, soils had played an important part, some being more susceptible than others to improvement by cultivation, but this is nevertheless a matter for serious regard by those concerned.

Manangatang District.

Six entries were received in this competition. Messrs. N. Langley and C. H. Westblade, 82 points each, were equal for first place, and Mr. C. Cooper, 80 points, was second.

TABLE OF AWARDS—MANANGATANG FALLOW COMPETITION.

Best 100 Acres of Fallow.

Name.	Moisture.	Mulch.	Cultivation.	Absence of Weeds.	Total.
Possible points	**25**	**25**	**25**	**25**	**100**
N. Langley	20	21	20	21	82
C. H. Westblade	19	20	20	23	82
C. Cooper	17	20	22	21	80
R. Wharton	17	19	22	19	77
J. S. McFarlane	18	19	18	22	77
A. Wohlers	22	18	15	19	74

Winnambool District.

The creditable number of fourteen entries was received, and some very good fallows were inspected. Mr. N. C. Jones (94 points) secured first award, Messrs. R. McGuigan, No. 1 entry, and J. Cullen, No. 1 entry (93 points each) equal second, and Mr. A. Golds (91 points) third.

Mr. Jones's land had been mouldboard ploughed 3½ inches in July, and harrowed immediately; scarified August, harrowed and scarified, and again harrowed early in January. The moisture content was satisfactory throughout, the mulch of nice depth, and except for being a little windswept on the rise, in good order. The depth of cultivation was fairly regular, and consolidation of the seed bed good. Practically no weeds were present.

Mr. R. McGuigan's fallow also showed very satisfactory moisture, mulch in good order, though a little shallow in places. The seed bed was well consolidated and level. Odd paddy melons and barley grass plants caused the loss of a few points. The land was disc ploughed 4 inches deep in June, and harrowed immediately, springtooth cultivated end August, harrowed late September and again in December, and sheep were run on the fallow.

Mr. Cullen's fallow had been scarified 3½ inches deep in July, and harrowed immediately, cross-scarified and harrowed mid-August, springtooth cultivated early October, harrowed January, and sheeped throughout. This fallow was very clean, cultivation of regular depth, and seed bed consolidated. The mulch was of good depth, but a little fine on the flats, and the moisture content good throughout.

Mr. A. Gold's fallow was also in good order. It had been mouldboard ploughed 3½ inches in July, harrowed and cross-harrowed immediately, scarified and harrowed October, and harrowed January.

TABLE OF AWARDS—WINNAMBOOL FALLOW COMPETITION.

Best 100 *Acres of Fallow.*

Competitor.	Moisture.	Mulch.	Cultivation.	Absence of Weeds.	Total.
Possible points	**25**	**25**	**25**	**25**	**100**
N. C. Jones	24	23	23	24	94
J. Cullen, No. 1 entry ..	23	23	23	24	93
R. McGuigan, No. 1 entry	24	23	24	22	93
A. Golds	22	23	22	24	91
J. Cullen, No. 2 entry ..	20	22	22	23	87
A. H. Baker	19	21	23	23	86
H. P. Dyason	22	22	20	22	86
W. A. H. Frost	21	23	22	19	85
L. J. Molyneaux	21	22	20	20	83
R. McGuigan, No. 2 entry	21	21	19	22	83
E. F. Amos	19	19	22	23	83
D. Chisholm	19	21	20	20	80
M. Boland	23	19	20	16	78
T. Holt	18	17	18	18	71

Koimbo District.

Seven entries were received in this district. Mr. D. D. Johnstone secured first award with an excellent entry, which was awarded 94 points; Mr. H. Burgess, second place, secured 80 points. Mr. Johnstone's fallow was very well charged with moisture, the mulch was in good order and about the right depth, the seed bed was firm and fairly level, and very little weed growth was present.

Portion of the land had been ploughed with the Sundercut in July, and springtooth cultivated end of July. The remainder was mouldboard ploughed early in August from 2 inches on the sandhills to 4 inches on the flats. The whole area then received seven workings with the springtooth cultivator and three harrowings up to early January. All workings were carried out after rain; the first cultivation was made to 3½ inches, and subsequent workings gradually shallower to 2 inches. Mr. Johnstone intended to maintain this depth in any future cultivations, and to sow to this seed bed.

Table of Awards—Koimbo Fallow Competition.

Best 100 *Acres of Fallow.*

Competitor.	Moisture.	Mulch.	Cultivation.	Absence of Weeds.	Total.
Possible Points	**25**	**25**	**25**	**25**	**100**
D. D. Johnstone	24	24	23	23	94
H. Burgess	20	20	19	21	80
S. J. Plant	21	21	19	18	79
W. C. Franz	20	20	19	19	78
F. Saunders	20	16	18	12	66
E. Lawler	22	14	14	14	64
T. Yole	18	15	15	14	62

Wemen, Lipparoo, and Moss Tank Districts.

Nine entries, including some excellent fallows, were inspected. The work done by competitors is particularly commendable in view of the fact that settlement is comparatively recent, and much of the land concerned is as yet not free from shoots. Some "new" land fallow was exhibited.

First place is awarded Mr. A. Wells's entry, with 98 points; equal second, Messrs N. V. Pattinson and V. R. T. Graham, 88 points each; and third, Mr. E. Radford, 87 points.

Mr. A. Wells's fallow has been previously described. It received the following cultivation:—Skim-ploughed 3 inches deep early July, and immediately harrowed and cross-harrowed, then springtooth cultivated three times after rain to early October, the last working being north and south.

Mr. Pattinson's fallow, otherwise in excellent condition, lost points on account of the presence of some weeds and self-sown wheat. The land was mostly fairly heavy Mallee land, which had been mouldboard ploughed 2½ inches to 3 inches in June, springtooth cultivated 2½ inches

July, flats harrowed twice and the remainder once in August. In September horses were driven over a sand hill while wet to pack the soil, and the whole area was spring-toothed. In October the whole was springtoothed, and the flats harrowed in January.

Mr. Graham's fallow land was mostly fairly loamy soil, previously timbered with big mallee and odd pine and belar. It contained a satisfactory percentage of moisture, the mulch was of nice texture, but the depth of cultivation was a little irregular. Cultivation was as follows:—Ploughed with undercut 3½-4 inches June-July, harrowed end July, undercut 3 inches September, and harrowed and springtooth cultivated end of December.

Table of Awards—Fallow Competition, Wemen, Lipparoo, and Moss Tank Districts.

For Best 50 Acres of Fallow.

Competitor.	Moisture.	Mulch.	Cultivation.	Absence of Weeds.	Total.
Possible Points	**25**	**25**	**25**	**25**	**100**
A. Wells	25	24	25	24	98
N. V. Pattinson	23	24	23	18	88
V. R. T. Graham ..	22	22	21	23	88
E. Radford	21	22	20	24	87
C. S. Neyland	19	20	23	24	86
T. J. O'Loughlin	20	21	20	22	83
F. D. Taylor	18	20	21	23	82
F. D. Francis	20	22	19	18	79
A. Drinkwater	21	20	18	16	75

Chinkapook District.

The fallowed land seen in this competition varied from heavy "dillon-bush flats" to sandy and grey limey soils. The task of those working the first class of ground undoubtedly calls for the exercise of even more skill and judgment than is required to bring the other soils into good tilth. Such land can be worked to advantage during only a very limited period after rain. Working cannot be commenced as soon after rain as on the lighter soils; the work is heavier, and must, of course, be completed before the soil dries out in order to produce a satisfactory tilth. Working dry, or in any way that tends to produce a fine, floury mulch, renders the soil liable to set hard after further rains. Farmers who have mixed areas under cultivation are well advised to endeavour to concentrate on these portions, when they are working well; by doing this and avoiding the creation of too fine a mulch, these soils can be brought into good order, and the lighter soils can, of course, be cultivated over a longer period without harmful effect.

Eight entries were received in the competition. First place is awarded to Mr. W. J. Gray, 94 points; second, Mr. P. A. Wilson, 93 points; and third, Messrs. Barry Bros'. No. 2 entry.

Mr. Gray's fallow contained a satisfactory amount of moisture and a nice depth of mulch, the texture of which was perhaps a little rough.

The depth of cultivation and consolidation of the seed bed were fairly regular, and no weeds were present. The soil varied from limey ground to red loam. It had been mouldboard ploughed 3 inches in June-July, and harrowed immediately, springtooth cultivated end of August and in September and October, and sheeped throughout the summer.

Mr. P. Wilson's fallow was satisfactory in respect to moisture content, condition of mulch, and absence of weeds. The depth of cultivation and consolidation of the seed bed were rather irregular. Cultivation:—Mouldboard ploughed 3 inches June-July, part harrowed July, and all harrowed August, springtooth cultivated end of September, harrowed early January, and sheeped throughout.

Messrs. Barry Bros'. fallow was of mixed grey limey soil and "dillon-bush" flats. The grey soil offers difficulties in that it dries out rapidly after rain, and is of very loose nature, making difficult the formation of a firm seed bed. In the face of these difficulties, the fallow exhibited was particularly meritorious. It had been scarified 3 inches deep in March, scarified again middle of June, harrowed early July, scarified and harrowed early August, and harrowed September.

TABLE OF AWARDS—CHINKAPOOK FALLOW COMPETITION.

For Best 100 *Acres of Fallow.*

Name of Competitor.	Moisture.	Mulch.	Cultivation.	Absence of Weeds.	Total.
Possible points	**25**	**25**	**25**	**25**	**100**
W. J. Gray	23	23	23	25	94
P. A. Wilson	23	24	22	24	93
Barry Bros., No. 2 entry ..	22	23	23	23	91
Barry Bros., No. 1 entry ..	21	23	22	23	89
P. J. Sharp	21	23	23	22	89
J. Detring	22	22	20	23	87
G. Bennett	22	23	21	15	81
P. Barnham	20	18	20	18	76

Pier Millan District.

Of the eleven exhibits inspected, the entries of Messrs. E. Daniell (94 points), R. E. Stewart (92 points), and V. W. Daniell (90 points) were awarded respectively first second, and third places. The standard of the fallows throughout the competition was good.

Mr. E. Daniell's land had been lightly springtoothed in February, mouldboard ploughed 3 inches in July, springtooth cultivated and harrowed August, and springtooth cultivated September and October. Sheep had access to the fallow. The land was clean, the moisture content very good in both subsoil and seed bed, and the seed bed fairly regular and consolidated. The surface mulch, which was fine and of nice depth, had not suffered to any extent on account of the heavy winds experienced, only an odd exposed part being blown; on the remainder the ridges left by the cultivator were still visible.

Mr. Stewart's fallow was not quite as high in moisture, nor as regular in regard to depth of cultivation as was the winning exhibit. It had been worked with the "sundercut" in February, skim-ploughed 2½ inches in July, and scarified at the end of that month, harrowed early in August, scarified early and harrowed latter end of September, and springtooth cultivated early in October. Sheep were allowed on the fallow.

Mr. V. W. Daniell's fallow contained a large proportion of grey limey ground. The moisture content, though lower than that of the previous entries, was very satisfactory for the class of land. The mulch was in nice order, and the seed bed consolidated and only slightly ridgy. Cultivation was as follows:—Springtooth cultivated 3 inches in February, scarified 3 inches in June, scarified to a lesser depth in July and in August, and springtooth cultivated 2 inches deep early in October. The paddock was open to sheep.

TABLE OF AWARDS—PIER MILLAN FALLOW COMPETITION.

For Best 100 *Acres of Fallow.*

Competitor.	Moisture.	Mulch.	Cultivation.	Absence of Weeds.	Total.
Possible points	**25**	**25**	**25**	**25**	**100**
E. Daniell	24	23	23	24	94
R. E. Stewart	23	23	22	24	92
V. W. Daniell	21	23	23	23	90
W. Lane	22	22	21	24	89
A. Vanderfeen, No. 2 entry (west half of paddock) ..	23	22	18	23	86
Dickinson & Oliver ..	22	20	18	24	84
F. England	21	21	20	21	83
A. Vanderfeen, No. 1 entry	22	21	18	21	82
S. C. Lawrence	20	21	20	20	81
G. Glowrey	18	22	21	20	81
J. P. Barry	23	15	15	21	74

Larundel District.

Eight entries were received. First place is awarded to Mr. H. J. Carr with 93 points, and second to Mr. I. A. Sharp, 89 points.

Mr. Carr's entry was of fairly light sand hills to grey limey flats. On these soils consolidation of the seed bed below the mulch is the most difficult problem. This had been satisfactorily done, and the seed bed was firm and fairly regular on the surface. The moisture content was very good, even on the grey land; few weeds were present, and the surface mulch was in good order and of nice depth. The land had been scarified 4 inches deep in February, harrowed July, skim-ploughed 2½ inches July-August, and springtooth cultivated mid-October.

Mr. I. A. Sharp's fallow, mostly of sandy hills with a strong subsoil, showed satisfactory moisture, and was free of weeds. The mulch was a little rough on the flats, and consolidation of the seed bed was here irregular. Cultivation:—Mouldboard ploughed 3½ inches early in June, and springtooth cultivated August and again at end of September.

TABLE OF AWARDS—LARUNDEL FALLOW COMPETITION.

For Best 100 Acres of Fallow.

Competitor.	Moisture.	Mulch.	Cultivation.	Absence of Weeds.	Total.
Possible Points	**25**	**25**	**25**	**25**	**100**
H. J. Carr	24	23	23	23	93
I. A. Sharp	22	22	21	24	89
W. L. Turner	20	20	18	23	81
P. Sharp	21	20	21	19	81
– Dawson	22	20	20	15	77
H. P. Carr	22	20	16	18	76
T. J. Carr	21	14	13	23	71
W. L. Haslett	21	14	15	15	65

VALENCIA LATE ORANGES.

COOL STORAGE EXPERIMENTS.

By G. B. Tindale, B.Agr. Sc., Cool Storage Experimentalist.

Last season's experiments showed that Navel oranges may be kept in cool store in good condition for periods up to three months, provided they are properly handled. The successful storage of the Valencia Late is, however, more important, for if the fruit of this variety can be kept from November till March it can be made available all through the summer months, when there exists a big demand for oranges in a fresh state and for use as drinks.

Last season the Victorian railways refreshment services decided to store some 3,500 cases of Valencia Late oranges that were required for use later in their fruit drink stalls. It was desired that these be kept for at least three months, and as it was largely in the nature of an experiment, the co-operation of the Agricultural Department was sought and heartily given.

The limiting factor in the storage of oranges is the development of blue mould, and every endeavour was made by Messrs. Muir (Citrus Supervisor, Mildura) and Krone (Fruit Packing Instructor) to see that the fruit was at all times handled in such a way as would guard against any condition that might favour the growth of the blue mould fungus.

How the Fruit was Handled.

(1) PICKING.

The oranges were harvested when they had just reached maturity. This work was done very carefully, so as to minimize the chances of bruising, and growers were advised to wear gloves while picking, or else to trim their finger nails very short. The fruit was picked when quite dry. In each case the stem was removed close to the button.

(2) SWEATING.

After picking, the oranges were carefully placed (not tipped) into the cases, which were then carted to an open shed for sweating, and

stacked so as to allow a free circulation of air between them. The period of sweating was about a week. (During November and December, when the atmosphere is very dry, three or four days would probably be sufficient.) By sweating, the skins become drier, tougher, and more pliable, and hence are not so liable to be bruised whilst being handled.

(3) Packing.

After sweating, the oranges were packed according to methods shown on the departmental packing chart. Care was taken to roll them into the sizer, not tip them in. They were then forwarded to the Government Cool Stores, Melbourne, where they arrived during November and December last. That the growers had carried out their part was evident, for an examination of the fruit on arrival at the cool stores showed a complete absence of mould.

(4) Storing.

The oranges were placed in a separate chamber at 38 deg. F. Twelve cases, taken at random from a consignment of one grower, received on the 16th December, were stored in the experimental chambers—three cases at each of the following temperatures:—34 deg., 36 deg., 38 deg., 40 deg. F.

The Result of the Experiments.

In the cool store the oranges were kept under close observation, and until the end of February the results were very satisfactory, the total losses after examination and repacking being estimated at under 5 per cent. After this, however, the percentage of loss increased, mould being the cause, while the appearance of some of the fruit was spoiled by the development of brown spots on the skin. It was thus evident that it was in the store that the mould had its origin. Several cases were taken down, and it was observed that those towards the centre of the stack were quite damp; mould was actually growing on the inside of the cases, and was spreading over the fruit. These oranges would, no doubt, have soon become penetrated by the mould. In many of these fruits, too, "browning" or "scald" was to be seen, but it was not confined to the button edge of the orange, as was noted in case of Washington Navels (see this *Journal*, February, 1927, page 76).

Probable Cause of Blue Mould.

It is well known that where the cold air does not circulate the humid conditions which prevail in such air pockets offer comparatively favorable opportunities for mould development, and where it is intended to store oranges for many weeks, special provision should be made to allow complete air circulation around each case. This is a matter that will receive special attention when oranges are stored at the Government Cool Stores in the future.

Next season special observations will be made on the effect of air circulation as a means of preventing the development of blue mould and overcoming the browning trouble, as it would seem that this trouble is more liable to occur when the cases are damp.

On the 20th April (after four months' storage) the oranges from the experimental chambers were examined. Their condition was excellent,

only eight mouldy ones being found in the twelve cases. The loss of weight varied from 4¾ lb. for those stored at 40 deg., to ¾ lb. for those stored at 34 deg. The oranges kept at 36 deg. and upwards still maintained the natural shine of the skins, while the flavour was excellent.

A Corner of the Stack.
(When storing in future, cases will be spaced further apart.)

The skins of some of those stored at 34 deg., however, had become dull. It had been previously observed that when the skin loses it shine the orange very quickly breaks down, and such an orange develops a bitter flavour.

It was further noted that those held in the experimental chambers were quite free from surface spotting or "browning," and, furthermore, being quite dry, there was not a trace of mould growing on the inside of the cases or on the oranges themselves.

The question arises, Why did these keep in excellent condition so much longer than those stored *en masse*. This is probably explained by the fact that in the small experimental chambers the cases are spaced further apart, and thus air pockets of saturated air do not form.

In conclusion, it will be seen that oranges are subject to blue mould prior to entering the cool store—this may be controlled by careful handling—and also in the cool store itself. Spacing of the cases so as to allow air circulation around each case should reduce this to a minimum.

A temperature of 37 deg. F. would appear to be the most suitable, as a fluctuation in temperature 3 deg. either way would not be attended with any harmful results.

Provided these conditions are observed, then one could expect to store Valencia Late oranges in excellent condition for a period of some three to four months.

NUMBER OF CASES OF ORANGES STORED AT THE GOVERNMENT COOL STORE DURING THE LAST FOUR SEASONS.

Season.	No. of Cases.
1923-24	3,423
1924-25	26,259
1925-26	16,828
1926-27	12,868

Owing to lighter crops and increased local consumption, the necessity to store was not so great during the last two seasons.

In 1924-25 season a large number of cases were left in store for short periods only.

The maximum period for which each variety was held during the four seasons was:—

Season.	Variety.	Maximum Period for which Stored.
1923–4	Washington Navels ..	8 weeks.
	Valencias	6 „
1924–5	Washington Navels ..	6 „
	Valencias	16 „
1925–6	Washington Navels ..	4 „
	Valencias	8 „
1926–7	Washington Navels ..	8 „
	Valencias	12 weeks (some up to 16 weeks).

These results indicate that with suitable treatment there should be no difficulty in connexion with shipments to the United Kingdom or other oversea markets.

REGISTRATION OF STALLIONS.

Seventh Annual Report under the Horse Breeding Acts 1919-1925.

By E. A. Kendall, B.V. Sc., Chief Veterinary Inspector.

During the year 1926-27, 1,008 stallions were registered under the Horse Breeding Acts. Of this number 396 were examined by the veterinary officers at the 182 parades held during the year. These comprised five-year-olds and under, which are required by the provisions of the Act to be examined each year, if eligible for registration, till they reach six years of age, from which time they become exempt from the annual examination.

Of the 396 stallions examined there were 292 draughts, 64 light horses, while the pony class amounted to 40. The total number refused registration was 64, or 16.16 per cent., which is slightly higher than the percentage of rejections for the previous year.

Taking the stallions by classes, the results of examinations show that 46, or 15.75 per cent., draught stallions were refused registration—25 of them through unsoundness, while 21 were disapproved. The number rejected is the same as that for the previous year, but in view of the smaller number examined, the percentage of refusals is slightly higher. Of the 25 rejections for unsoundness, 20 or 6.85 per cent., were for sidebone, which is approximately the same as for the previous year. There were, however, four cases of ringbone, which accounts for the slightly higher total percentage of refusals for unsoundness,

A comparison of the summary of examinations for the two years 1925-26 and 1926-27 is shown hereunder. It must be noted that there were fewer refusals of light class animals, whereas with ponies there has been a small increase.

SUMMARY OF EXAMINATIONS, 1926-27.

	Draught.		Light.		Pony.		Total.	
	Examined. 292	Certificated. 246	Examined. 64	Certificated. 54	Examined. 40	Certificated. 32	Examined. 396	Certificated. 332
	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.
Bog Spavin ..	..	..	..	..	..	..	..	..
Bone Spavin ..	1	·34	2	3·13	1	2·50	4	1·01
Cataract ..	..	..	..	..	..	..	..	..
Curb	..	..	..	..	..	..	..	..
Osteo Porosis ..	..	..	..	..	1	2·50	1	·25
Ringbone ..	4	1·37	1	1·56	..	..	5	1·27
Roaring ..	..	..	1	1·56	..	..	1	·25
Shivering ..	..	..	1	1·56	..	..	1	·25
Sidebone ..	20	6·85	..	..	..	..	20	5·05
Stringhalt ..	..	..	..	..	..	..	..	..
Through unsoundness ..	25	8·56	5	7·81	2	5·00	32	8·08
Through disapproval ..	21	7·19	5	7·81	6	15·00	32	8·08
Total ..	46	15·75	10	15·62	8	20·00	64	16·16

SUMMARY OF EXAMINATIONS, 1925-26.

	Draught.		Light.		Pony.		Total.	
	Examined.	Certificated.	Examined.	Certificated.	Examined.	Certificated.	Examined.	Certificated.
	348	302	92	69	63	55	503	426
	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.	Rejected.	Per cent. Rejected.
Bog Spavin ..	1	·29	..	..	..	..	1	·19
Bone Spavin ..	1	·29	2	2·17	1	1·59	4	·80
Cataract ..	..	..	..	..	..	..	..	..
Curb	..	..	2	2.17	..	..	2	·40
Osteo Porosis ..	..	..	..	..	1	1·59	1	·19
Ringbone ..	1	·29	1	1·09	..	..	2	·40
Roaring ..	..	..	..	..	..	..	..	..
Shivering ..	2	.57	..	..	..	..	2	·47
Sidebone ..	23	6·60	..	..	..	..	23	4·50
Stringhalt ..	..	..	..	..	..	..	..	..
Through unsoundness ..	28	8·04	5	5·43	2	3·18	35	6·95
Through disapproval ..	18	5·17	18	19·57	6	9·52	42	8·35
Total ..	46	13·21	23	25·00	8	12·70	77	15·30

Appeals.

Three appeals were lodged against the Veterinary Officer's decision during the past year. In one case, in which the rejection was for spavin, the appeal was upheld by the Appeal Board, whilst in the other two instances—one of sidebone and one of disapproval—the appeals were dismissed.

The Horse Breeding Act 1925.

The past year is notable as having been the first in which the *Amending Horse Breeding Act* 1925 has been in operation. One of the important features of this Act is that providing for the payment of compensation to the owner of a stallion which, after being previously registered, is refused registration at the next year's inspection on the ground of unsoundness.

The amount payable on castration of a rejected stallion, in a case where the owner has purchased the animal, is 75 per cent. of the purchase price. The owner of a stallion bred by him is entitled to a sum equal to £30 for each year of age. Provision is made, however, in cases where the amount thus payable would, in the opinion of the Chief Veterinary Inspector, exceed the value of the stallion for stud purposes with other than thoroughbred mares, that the sum shall be determined by the Minister.

Claims for compensation on account of 13 draught, 3 light, and 1 pony stallions, which had been rejected, were dealt with during the year under review. One owner elected to avail himself of the alternative of retaining his rejected stallion in his own possession on payment of an annual fee of £1, as allowed by the Act, for stud purposes with his own mares.

The Future of the Horse Breeding Industry.

Comparison of the numbers of stallions registered for the year 1926-27 shows a marked falling off from the previous year. In 1925-26, 1,492 stallions were registered, whereas last year the number dropped to 1,008, a decline of 484, which is sufficiently striking to excite comment.

All three classes suffered in this respect, the percentage being highest amongst the light and pony classes. It is not difficult to account for the decline in these two classes, as the permanency of their displacement by the motor car would appear to be fairly definitely determined. It is significant, however, that the draught class has also fallen off appreciably, and while this is no doubt accounted for in part by the incursion of the tractor and motor waggon, the fact that it is difficult for the demand for young weighty sound geldings to be met at good prices suggests another reason. During recent years a considerable number of the older generation of draught horse breeders have retired, or passed away, and with few exceptions the industry is not being carried on by their sons or successors. The younger generation is naturally more apt to think in terms of horse power as applied to motor traction than to horseflesh, and is thus disinclined to take over the industry from those who have retired from it.

Every one must recognize that motor traction power has come to stay, but this does not by any means imply that the day of the draught horse is about to end. Industrial firms in England have realized that it is more economical to use horses for short distance haulage. The result is that motor transport has been discarded in favour of the horse, and the supply of horses for this purpose has been unequal to the demand. A considerable revival of horse breeding has set in in consequence.

Similar experiences are being met with in the United States of America. Three years ago about 80 per cent of the haulage between wharves and the stores was done by motor transport. Seventy-five per cent. of it is now done by horses, and this in a country where petrol is cheap.

The return of the draught horse to favour on the American side of the world would appear to be further emphasized by the increasing importation of Clydesdales into Canada. Twenty-three were imported in 1924, in 1925 the number increased to 82, while in 1926 it reached 99. In addition to these Clydesdales, a number of Shires and Percherons were also imported.

From these facts it is not unreasonable to suppose that comparisons between the cost of haulage as between motor and horse in Australia, when it is applied to short distances and on small farms, will yield similar results in favour of the horse, and lead to a revival of the industry.

That there are a few enterprising breeders already convinced of this appears to be evident from the sums they are willing to pay for high class stallions, a conspicuous instance being the record price of 1,500 guineas recently given for a fashionably bred yearling Clydesdale colt got from high class imported parents in this State.

Parades for Coming Season.

The centres at which parades will be held during the season 1927-28 for the examination of stallions for registration are appended to this report.

Owners of stallions are advised to study the schedule of parades for choice of centre to meet their convenience. Application should then be made on or before the 1st July, 1927, on the prescribed form for registration. Owners are reminded that under the *Horse Breeding Act* 1925 it is now compulsory to forward with each application the sum of £3, being £1 registration fee and £2 compensation fee.

The schedule of centres at which parades will be held is compiled as far as possible to meet all requirements, and to enable the inspections to be completed before the commencement of the Royal Show.

Veterinary officers will not necessarily attend any place specified in the schedule unless a notification is received that a stallion will be presented there for examination on the date and hour fixed in the schedule.

Forms of application may be obtained from secretaries of agricultural societies and from officers in charge of police stations, for whose assistance in this connexion the thanks of this Department are due.

Owners of stallions must bear in mind that change of ownership should be notified without delay in order that the certificate of registration can be suitably endorsed. A registration expires within 30 days unless the required notice is given.

Copies of the regulations under the amending Act are obtainable from the Department, and owners of stallions should make themselves acquainted with them.

STALLION REGISTER.

List of stallions in respect of which certificates of registration have been refused, but which, the owners having paid the prescribed fees, may be retained for breeding purposes with owners' own mares only:—

Name.	Age.	Class.	Owner.	Address.
	Yrs.			
Baron Bellum ..	5	Draught ..	Coy, F. C. & Coy.	Bookar via Camperdown
British Isles ..	A	Light	Bray, Mrs. A. ..	Coonoor, Heidelberg
Nugget II.	A	Draught ..	Lord, Geo. ..	Eskdale
Ondit	4	,, ..	Thornley, N. Exors.	Hawkesdale

STALLION PARADES.

TIME TABLE, 1927.

Provided that the applications for registration received indicate that a horse will be in attendance there for examination, a parade will be held at each of the following places :—

No. and Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
No. 1.				
Monday, June 20 ..	Dunolly ..	1.38 p.m.	1.38 p.m. ..	
Monday, June 20 ..	Maryborough	4.30 p.m...	4.30 p.m. ..	3.35 p.m.
Tuesday, June 21 ..	Mildura ..	11 a.m. ..	7.25 a.m. ..	10.20 p.m.
Tuesday, June 21 ..	Carwarp ..	3 p.m. ..	Driving ..	8 a.m. (22nd)
Wednesday, June 22..	Ouyen ..	10.30 a.m.	10.12 a.m. ..	Driving
Wednesday, June 22..	Galah ..	11.30 a.m.	Driving ..	Driving
Wednesday, June 22..	Walpeup ..	12.15 p.m.	Driving ..	Driving
Wednesday, June 22..	Underbool ..	1.30 p.m.	Driving ..	Driving
Wednesday, June 22..	Boinka ..	2.15 p.m.	Driving ..	Driving
Wednesday, June 22..	Tutye ..	2.45 p.m.	Driving ..	Driving
Wednesday, June 22..	Cowangie ..	3.30 p.m.	Driving ..	Driving
Wednesday, June 22..	Murrayville..	4.30 p.m.	Driving ..	Driving
Wednesday, June 22..	Panitya ..	5 p.m. ..	Driving ..	Driving
No. 2.				
Tuesday, June 21 ..	Woomelang	10 a.m. ..	9.15 p.m. (20th)	12.15 p.m.
Tuesday, June 21 ..	Watchem ..	2 p.m. ..	1.48 p.m. ..	6.43 p.m.
Wednesday, June 22..	Birchip ..	10 a.m ..	7.14 p.m. (21st)	1.23 p.m.
Wednesday, June 22..	St. Arnaud	3.30 p.m.	3.20 p.m. ..	12.4 a.m. (23rd)
Thursday, June 23 ..	Donald ..	11 a.m. ..	12.56 a.m. ..	2.30 p.m.
No. 3.				
Tuesday, June 28 ..	Sea Lake ..	10 a.m. ..	7.40 p.m. (27th)	9.50 a.m. (29th)
Tuesday, June 28 ..	Nandaly ..	12 noon ..	Driving ..	Driving
Tuesday, June 28 ..	Culgoa (Railway Station)	3.30 p.m.	Driving ..	Driving
Wednesday, June 29..	Wycheproof (Railway Station)	12 noon ..	12 noon ..	12.25 p.m.
No. 4.				
Tuesday, June 28 ..	Charlton ..	11 a.m. ..	3.51 p.m. (27th)	1.43 p.m.
Tuesday, June 28 ..	Korong Vale	2.45 p.m...	2.45 p.m. ..	3.20 p.m.
Tuesday, June 28 ..	Boort (Railway Station)	4.26 p.m...	4.26 p.m. ..	5 p.m.
Wednesday, June 29..	Quambatook	10 a.m. ..	6.23 p.m. (28th)	11.5 a.m.
Wednesday, June 29..	Inglewood ..	4.15 p.m.	4.15 p.m. ..	1.29 p.m. (30th)
Thursday, June 30 ..	Wedderburn (Railway Station)	2.35 p.m...	2.35 p.m. ..	3.10 p.m.
No. 5.				
Monday, June 27 ..	Mitiamo (Railway Station)	1.25 p.m.	1.25 p.m. ..	1.43 p.m.
Monday, June 27 ..	Pyramid ..	2.6 p.m. ..	2.6 p.m. ..	7.10 a.m. (28th)
Tuesday, June 28 ..	Raywood ..	11 a.m. ..	9.18 a.m. ..	12.50 p.m.
Tuesday, June 28 ..	Tandarra ..	1.5 p.m. ..	1.4 p.m. ..	4.42 p.m.
Wednesday, June 29	Bendigo ..	11 a.m. ..	6.10 p.m. (28th)	3.15 p.m.
Wednesday, June 29	Marong ..	9.30 a.m...	Driving ..	Driving
Wednesday, June 29	Castlemaine	4.30 p.m...	4.5 p.m. ..	Driving
Thursday, June 30 ..	Shelbourne ..	10 a.m. ..	Driving ..	Driving
Thursday, June 30 ..	Maldon ..	12 noon ..	Driving ..	Driving
Thursday, June 30 ..	Newstead ..	3 p.m. ..	Driving ..	Driving

STALLION PARADES, TIME TABLE—*continued.*

No. and Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
No. 6.				
Monday, June 27 ..	Macorna (Railway Station)	2.26 p.m...	2.26 p.m. ..	11.17 p.m.
Tuesday, June 28 ..	Koondrook..	10.30 a.m.	Driving ..	Driving
Tuesday, June 28 ..	Kerang ..	2 p.m. ..	Driving ..	3.55 p.m.
Wednesday, June 29	Piangil ..	9.30 a.m.	Driving ..	Driving
Wednesday, June 29	Manangatang	11 a.m. ..	Driving ..	Driving
Wednesday, June 29	Chillingollah	Noon ..	Driving ..	Driving
Wednesday, June 29	Ultima ..	3 p.m. ..	Driving ..	Driving
Wednesday, June 29	Lalbert ..	4 p.m. ..	Driving ..	Driving
Thursday, June 30 ..	Swan Hill ..	10 a.m. ..	Driving ..	12 noon
No. 7.				
Tuesday, July 5 ..	Dimboola ..	10 a.m.	6.10 p.m. (4th)	11.30 a.m.
Tuesday, July 5 ..	Jeparit ..	1.20 p.m...	1.20 p.m. ..	2.10 p.m.
Tuesday, July 5 ..	Lorquon ..	3 p.m. ..	3 p.m. ..	3.5 p.m.
Tuesday, July 5 ..	Yanac ..	4.50 p.m...	4.50 p.m. ..	5.30 p.m.
Wednesday, July 6 ..	Kaniva ..	10 a.m. ..	2.33 a.m. ..	12 noon
Thursday, July 7 ..	Rainbow ..	1.30 p.m.	12 noon ..	2 30 p.m.
Thursday, July 7 ..	Yaapeet ..	12.30 p.m.	Driving ..	Driving
No. 8.				
Monday, July 4 ..	Lubeck ..	.. ..	3.25 p.m. ..	4.10 p.m.
Monday, July 4 ..	Rupanyup ..	.. ..	4.40 p.m. ..	5.5 p.m.
Tuesday, July 5 ..	Marnoo ..	.. ..	6.25 p.m. (4th)	10.50 a.m.
Tuesday, July 5 ..	Stawell ..	2.25 p.m...	2.25 p.m. ..	7.35 p.m.
Tuesday, July 5 ..	Glenorchy ..	4.30 p.m...	Driving ..	Driving
Wednesday, July 6 ..	Navarre ..	11 a.m. ..	Driving ..	Driving
Wednesday, July 6 ..	Ararat ..	2 p.m. ..	8.35 p.m. ..	6.20 a.m. (7th)
Thursday, July 7 ..	Avoca ..	10 a.m. ..	8.20 a.m. ..	3.40 p.m.
No. 9.				
Monday, July 4 ..	Heathcote ..	2 p.m. ..	10.30 a.m. ..	6.22 p.m.
Tuesday, July 5 ..	Alexandra ..	2 p.m. ..	12.33 p.m. ..	3.50 p.m.
Wednesday, July 6 ..	Yea ..	9 a.m. ..	5.28 p.m. (5th)	10.30 a.m.
Wednesday, July 6 ..	Mansfield ..	2 p.m. ..	1.40 p.m. ..	3.30 p.m.
Thursday, July 7 ..	Kilmore ..	9 a.m. ..	9.30 p.m. (6th)	9.40 a.m.
No. 10.				
Tuesday, July 5 ..	Hopetoun ..	10 a.m. ..	9.40 p.m. (4th)..	7.20 a.m. (6th)
Tuesday, July 5 ..	Patchewollock	12 noon ..	Driving ..	Driving
Tuesday, July 5 ..	Speed ..	3 p.m. ..	Driving ..	Driving
Wednesday, July 6 ..	Warracknabeal	10 a.m. ..	10 a.m. ..	6.50 p.m.
Thursday, July 7 ..	Beulah ..	9.30 a.m...	8.20 p.m. (6th)..	12.5 p.m.
Thursday, July 7 ..	Minyip ..	3.15 p.m...	3.10 p.m. ..	11.45 a.m. (8th)
Friday, July 8 ..	Murtoa (Railway Station)	12.35 p.m.	12.35 p.m. ..	1.10 p.m.
No. 11.				
Monday, July 11 ..	Tungamah ..	1.30 p.m...	1.10 p.m. ..	3.21 p.m.
Monday, July 11 ..	Devenish ..	4 p.m. ..	4 p.m. ..	8.43 p.m.
Tuesday, July 12 ..	Yarrawonga	11 a.m. ..	9.52 p.m. (11th)	2.45 p.m.
Wednesday, July 13..	Benalla ..	9.30 a.m.	5.10 p.m. (12th)	11.15 a.m.
Wednesday, July 13..	Rutherglen	2 p.m. ..	1.53 p.m. ..	7.40 a.m. (14th)
Thursday, July 14 ..	Barnawartha	2 p.m. ..	1.25 p.m. ..	3 p.m

STALLION PARADES, TIME TABLE—*continued.*

No. and Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
No. 12.				
Monday, July 11 ..	Tallangatta..	4 p.m. ..	3.53 p.m. ..	11.10 a.m. (13th)
Tuesday, July 12 ..	Corryong ..	12.30 p.m.	Driving ..	Driving
Wednesday, July 13..	Wodonga (Railway Station)	12.50 p.m.	12.50 p.m. ..	3.5 p.m.
No. 13.				
Monday, July 11 ..	Moyhu ..	2 p.m. ..	Driving ..	Driving
Monday, July 11 ..	Whitfield ..	4 p.m. ..	Driving ..	Driving
Tuesday, July 12 ..	Wangaratta	10 a.m. ..	Driving ..	12.39 p.m.
Tuesday, July 12 ..	Bright ..	4.7 p.m. ..	4.7 p.m. ..	6.4 a.m. (13th)
Wednesday, July 13	Myrtleford ..	2 p.m. ..	7.12 a.m ..	7.12 a.m. (14th)
Thursday, July 14 ..	Beechworth	11 a.m. ..	10.24 a.m. ..	12.51 p.m.
Thursday, July 14 ..	Everton ..	2 p.m. ..	1.11 p.m. ..	3.30 p.m.
Friday, July 15 ..	Euroa ..	10 a.m. ..	6.27 p.m. (14th)	11. a.m.
Friday, July 15 ..	Seymour ..	1 p.m. ..	12.5 p.m. ..	5 p.m.
No. 14.				
Tuesday, July 14 ..	Natimuk ..	11.5 a.m.	11.5 p.m. ..	11.30 a.m.
Tuesday, July 12 ..	Goroke ..	3 p.m. ..	1.15 p.m. ..	6 p.m.
Wednesday, July 13..	Horsham ..	9 a.m. ..	9.5 p.m. (12th)..	Driving
Thursday, July 14 ..	Toolondo ..	12 noon ..	Driving ..	Driving
No. 15.				
Monday, July 18 ..	Kyabram ..	12.15 p.m.	12.11 p.m. ..	Driving
Monday, July 18 ..	Tongala ..	3 p.m. ..	Driving ..	4.26 p.m.
Tuesday, July 19 ..	Tatura ..	9.30 a.m.	5.27 p.m. (18th)	11.30 a.m.
Tuesday, July 19 ..	Echuca ..	2 p.m. ..	1.15 p.m. ..	3.45 p.m.
Tuesday, July 19 ..	Rochester ..	4.30 p.m...	4.25 p.m. ..	9.3 a.m. (20th)
Wednesday, July 20..	Elmore ..	10 a.m. ..	9.40 a.m. ..	Driving
Wednesday, July 20..	Lockington ..	1 p.m. ..	Driving ..	2.12 p.m.
Wednesday, July 20..	Gunbower ..	3.11 p.m...	3.11 p.m. ..	Driving
Wednesday, July 20..	Cohuna ..	4.30 p.m...	Driving ..	6.35 a.m. (21st)
No. 16.				
Monday, July 18 ..	Dookie (Railway Station)	12.45 p.m.	12.45 p.m. ..	1 p.m.
Monday, July 18 ..	Katamatite (Railway Station)	2.5 p.m. ..	2.5 p.m. ..	2.50 p.m.
Tuesday, July 19 ..	Nagambie (Railway Station)	9 a.m. ..	7.7 p.m. (18th)	10.5 a.m.
Tuesday, July 19 ..	Shepparton..	Noon ..	11.20 a.m. ..	6 p.m.
Wednesday, July 20	Numurkah ..	10 a.m. ..	7 p.m. (19th) ..	12.24 p.m.
Wednesday, July 20	Strathmerton	12.47 p.m.	12.47 p.m. ..	1 p.m.
Wednesday, July 20	Cobram ..	2 p.m. ..	1.40 p.m. ..	3.30 p.m.
Thursday, July 21 ..	Nathalia ..	2 p.m. ..	1.32 p.m. ..	3.26 p.m.
Friday, July 22 ..	Murchison ..	9.30 a.m...	6.42 p.m. (21st)	10.58 a.m.
Friday, July 22 ..	Rushworth..	11.48 a.m.	11.48 a.m. ..	12.25 p.m.
Friday, July 22 ..	Colbinabbin	1.20 p.m...	1.20 p.m. ..	2.30 p.m.

STALLION PARADES, TIME TABLE—*continued.*

No. and Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
No. 17.				
Monday, July 18 ..	Wallace (Railway Station)	10.30 a.m.	10.35 a.m. ..	11.34 a.m.
Monday, July 18 ..	Ballan ..	12.2 p.m.	12.2 p.m. ..	Driving
Monday, July 18 ..	Bacchus Marsh	2 p.m. ..	Driving ..	Driving
Monday, July 18 ..	Melton ..	4 p.m. ..	Driving ..	8.45 p.m.
Tuesday, July 19 ..	Riddell	2.14 p.m.	2.14 p.m. ..	2.36 p.m.
No. 18.				
Tuesday, July 26 ..	Casterton ..	10 a.m. ..	7.40 p.m. (25th)	Driving
Tuesday, July 26 ..	Coleraine ..	3 p.m. ..	Driving ..	Driving
Wednesday, July 27	Edenhope ..	11 a.m. ..	Driving ..	Driving
Wednesday, July 27	Harrow ..	1 p.m. ..	Driving ..	Driving
Wednesday, July 27	Balmoral ..	2 p.m. ..	Driving ..	Driving
Wednesday, July 27	Cavendish ..	3 p.m. ..	Driving ..	Driving
Thursday, July 28 ..	Hamilton	10 a.m. ..	Driving ..	Driving
Thursday, July 28 ..	Dunkeld ..	12 noon ..	Driving ..	1.30 p.m.
No. 19.				
Tuesday, July 26 ..	Portland ..	10 a.m. ..	7.50 p.m. (25th)	9 a.m. (27th)
Wednesday, July 27	Heywood ..	10.30 a.m.	10.55 a.m. ..	3.46 p.m.
Wednesday, July 27	Dartmoor ..	2 p.m. ..	Driving ..	Driving
Thursday, July 28 ..	Branxholme	10 a.m. ..	5.22 p.m. (27th)	11.18 a.m.
No. 20.				
Monday, August 1 ..	Dean's Marsh	11.35 a.m.	11.30 a.m. ..	2.40 p.m.
Monday, August 1 ..	Birregurra ..	3.5 p.m. ..	3.5 p.m. ..	7.55 p.m.
Tuesday, August 2 ..	Colac ..	10 a.m. ..	8.21 p.m. (1st)	10.55 a.m.
Tuesday, August 2 ..	Gellibrand (Railway Station)	12.11 p.m.	12.11 p.m. ..	Continues journey by same train
Tuesday, August 2 ..	Beech Forest	2.10 p.m...	2.10 p.m. ..	2.45 p.m.
Wednesday, August 3	Winchelsea..	10 a.m. ..	7.50 p.m. (2nd)	11.13 a.m.
Thursday, August 4 ..	Lara ..	12.20 p.m.	12.20 p.m. ..	12.43 p.m.
No. 21.				
Monday, August 1 ..	Port Fairy ..	4 p.m. ..	2.50 p.m. ..	6 a.m. (2nd)
Tuesday, August 2 ..	Koroit ..	11 a.m. ..	6.36 a.m. ..	Driving
Tuesday, August 2 ..	Hawkesdale	1.30 p.m.	Driving ..	2.37 p.m.
Tuesday, August 2 ..	Penshurst ..	3.25 p.m...	3.25 p.m. ..	8.54 a.m. (3rd)
Wednesday, August 3	Warrnambool (Railway Station)	10.45 a.m.	10.45 a.m. ..	Driving
Wednesday, August 3	Terang ..	2.30 p.m.	Driving ..	Driving
Wednesday, August 3	Mortlake ..	3.30 p.m...	Driving ..	Driving
Thursday, August 4	Camperdown	11 a.m. ..	5.41 p.m. (3rd)	12 noon
Thursday, August 4	Timboon ..	1.45 p.m...	1.45 p.m. ..	2.55 p.m.
Thursday, August 4	Cobden ..	4.5 p.m. ..	4.5 p.m. ..	Driving
Friday, August 5 ..	Werribee ..	11.47 a.m.	11.47 a.m. ..	1.16 p.m.

STALLION PARADES, TIME TABLE—*continued.*

No. and Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
No. 22.				
Monday, August 1 ..	Drysdale ..	11 a.m. ..	9.30 a.m. ..	4 p.m.
Tuesday, August 2 ..	Meredith ..	10 a.m. ..	9.42 a.m. ..	11.13 a.m.
Tuesday, August 2 ..	Bannockburn	2 p.m. ..	11.38 a.m. ..	4.20 p.m.
Wednesday, August 3	Lismore ..	12 noon ..	11.49 a.m. ..	Driving
Wednesday, August 3	Vite Vite ..	2 p.m. ..	Driving ..	4.43 p.m.
Thursday, August 4	Cressy ..	10.30 a.m.	6.11 p.m. (3rd)	10.59 a.m.
Thursday, August 4	Westmere ..	2 p.m. ..	1.13 p.m. ..	3.58 p.m.
Friday, August 5 ..	Inverleigh ..	10 a.m. ..	9.47 a.m. ..	Driving
Friday, August 5 ..	Geelong ..	2 p.m. ..	12.10 p.m. ..	5.30 p.m.
No. 23.				
Tuesday, August 9 ..	Royal Show Grounds	2 p.m.		
No. 24.				
Monday, August 15 ..	Daylesford ..	Noon ..	11.55 a.m. ..	2 p.m.
Tuesday, August 16 ..	Waubra ..	10 a.m. ..	Driving ..	Driving
Tuesday, August 16 ..	Linton ..	2 p.m. ..	Driving ..	Driving
Tuesday, August 16 ..	Skipton ..	3 p.m. ..	Driving ..	Driving
Wednesday, August 17	Clunes ..	11 a.m. ..	8.36 a.m. ..	1.40 p.m.
Wednesday, August 17	Creswick ..	2.30 p.m...	2.13 p.m. ..	Driving
Wednesday, August 17	Kingston ..	3.30 p.m...	Driving ..	5.51 p.m.
Thursday, August 18..	Kyneton ..	10 a.m. ..	9.10 a.m. ..	Driving
Thursday, August 18..	Redesdale ..	2 p.m. ..	Driving ..	Driving
No. 25.				
Monday, August 15 ..	Morwell (Railway Station)	11.57 a.m.	11.57 a.m. ..	12.10 p.m.
Monday, August 15 ..	North Mirboo	3 p.m. ..	1.50 p.m. ..	4.25 p.m.
Tuesday, August 16..	Traralgon ..	10 a.m. ..	9.2 p.m. (15th)	12.20 p.m.
Tuesday, August 16 ..	Sale ..	2 p.m. ..	1.26 p.m. ..	6.20 a.m. (17th)
Wednesday, August 17	Maffra ..	9 a.m. ..	7.14 a.m. ..	10.50 a.m.
Wednesday, August 17	Cowwarr ..	2 p.m. ..	12.25 p.m. ..	4.55 p.m.
Thursday, August 18	Trafalgar ..	10 a.m. ..	6.51 p.m. (17th)	11.16 a.m.
Thursday, August 18..	Moe ..	Noon ..	11.26 a.m. ..	6.39 p.m.
No. 26.				
Monday, August 15 ..	Warragul ..	10.12 a.m.	10.12 a.m. ..	11.5 a.m.
Monday, August 15 ..	Neerim South	3 p.m. ..	12.20 p.m. ..	5.25 p.m.
Tuesday, August 16 ..	Bunyip ..	10 a.m. ..	9.38 a.m. ..	11.25 a.m.
Tuesday, August 16 ..	Pakenham ..	12 noon ..	11.54 a.m. ..	Driving
Tuesday, August 16 ..	Berwick ..	3 p.m. ..	Driving ..	9.19 p.m.
Wednesday, August 17	Cranbourne..	11 a.m. ..	8 a.m. ..	5.57 p.m.
Thursday, August 18	Wonthaggi ..	10 a.m. ..	9.5 p.m. (17th)	Driving
Thursday, August 18	Woolamai ..	3 p.m. ..	Driving ..	4.38 p.m.
Friday, August 19 ..	Lang Lang ..	9.15 a.m...	6.18 p.m. (18th)	9.51 a.m.
Friday, August 19 ..	Dandenong..	11.30 a.m.	11.14 a.m. ..	12.20 p.m.

STALLION PARADES, TIME TABLE—*continued.*

No. and Date.	Parade.	Time.	Officer Arrives.	Officer Departs.
No. 27.				
Tuesday, August 23..	Beaufort ..	2 p.m. ..	12.30 p.m. ..	6.37 p.m.
Wednesday, August 24	Willaura ..	10 a.m. ..	10.30 p.m. (23rd)	2.19 p.m.
Thursday, August 25	Nhill ..	3 p.m. ..	1.6 a.m. ..	1.9 a.m. (26th)
No. 28.				
Monday, August 22 ..	Korumburra	10.30 a.m.	10.22 a.m. ..	Driving
Monday, August 22 ..	Leongatha ..	2.30 p.m...	Driving ..	11.12 a.m. (23rd)
Tuesday, August 23 ..	Yarram ..	3.30 p.m...	2.15 p.m. ..	7 a.m. (24th)
Wednesday, August 24	Welshpool ..	10 a.m. ..	7.35 a.m. ..	Driving
Wednesday, August 24	Foster (Railway Station)	12 noon ..	Driving	Driving
Wednesday, August 24	Stony Creek	2 p.m. ..	Driving ..	Driving
No. 29.				
Tuesday, August 23 ..	Mernda ..	11 a.m. ..	10.32 a.m. ..	1.34 p.m.
Tuesday, August 23 ..	Whittlesea ..	2.30 p.m...	1.50 p.m. ..	7.45 p.m.
Wednesday, August 24	Lilydale ..	2 p.m. ..	1.59 p.m. ..	4.57 p.m.
Thursday, August 25	Romsey ..	11 a.m. ..	10.21 a.m. ..	Driving
No. 30.				
Monday, August 29 ..	Dromana ..	1.30 p.m...	1 p.m. ..	2 p.m.
Tuesday, August 30	Cowes ..	1 p.m.		
Wednesday, August 31	Stony Point	11.8 a.m.	11.8 a.m. ..	11.35 a.m.
Wednesday, August 31	Frankston ..	12.30 p.m.	12.25 p.m. ..	2.21 p.m.
Friday, September 2	Ballarat ..	2 p.m. ..	11.8 a.m. ..	6.15 p.m.
No. 31.				
Tuesday, August 30	Orbost ..	10 a.m. ..	6.40 p.m. (29th)	10.35 a.m. (31st)
Wednesday, August 31	Nowa Nowa	12.8 p.m.	12.8 p.m. ..	Driving
Wednesday, August 31	Buchan ..	1 p.m. ..	Driving ..	Driving
Thursday, September 1	Bairnsdale ..	Noon ..	11.30 a.m. ..	Driving
Thursday, September 1	Lindenow ..	2.30 p.m.	Driving ..	3 p.m.
No. 32.				
Tuesday, August 30	Ensay South	11 a.m.	11 a.m. ..	11.10 a.m.
Tuesday, August 30	Omeo ..	3 p.m. ..	3 p.m. ..	6.25 a.m. (31st)
Wednesday, August 31	Bruthen ..	12.25 p.m.	12.25 p.m. ..	1.5 p.m.
No. 33.				
Wednesday, Sept. 7 ..	Sunbury ..	11 a.m. ..	7.41 a.m. ..	2.56 p.m.
	French Island			
No. 34.				
Wednesday, Sept. 16	Royal Show	1.30 p.m.		
Thursday, Sept. 17 ..	Royal Show	9 a.m.		

WHEAT PICKLING METHODS.

By H. A. Mullett, B.Ag.Sc., Superintendent of Agriculture.

Year after year the diseases affecting wheat levy a heavy toll on Victoria's harvest. So accustomed have we become to their ravages that there is a tendency to look on them as inevitable—something that is "part of the game." But when it is remembered that wheat diseases do more damage annually than all other plant diseases put together, the seriousness of the position and the need for action may be realized.

Take-all, flag smut, loose smut, and bunt of wheat cost the wheat-growers and the State about £900,000 sterling a year! Were the attacks to come in big waves, like thrip and Rutherglen bug did last year, they would attract more attention. As it is, their incidence is comparatively steady, and people accept them as a matter of course.

The losses due to most wheat diseases may be minimized greatly by good farming practice, but bunt is the only wheat disease in Australia for which methods have been devised which give the farmer absolute control. The control in this case is so effective that the presence of smut in a crop is a clear indication that the treatment has been imperfectly applied.

A bunted head of wheat has a characteristic odour, not unlike that of rotten eggs. The grains at first sight appear to be intact, but closer inspection shows them to be replaced by spherical bodies, called smut balls, containing a mass of black powdery dust enclosed in a tough skin. This dust consists of the seeds of the fungus, the source from which it springs each year. Every smut ball contains several million smut seeds, any one of which may be capable of infecting a wheat plant.

The only way in which wheat may be attacked by smut is where the grain is sown with one or more smut seeds adhering to it! It is most important that every wheat-grower should realize that fact. It is not sufficient to assume because no smut balls are detected in a bag of wheat that smut is not present. One ball of smut is sufficient to thoroughly infect a whole bag of wheat under favorable conditions. The surface of a grain of wheat, more particularly the crease and the brush, may hold a few thousand smut seeds and never show any signs of their presence to the naked eye.

In Victoria, smut balls shed on the soil at harvest time are not capable of infecting the next crop. Thus, if there is smut in your crop at next harvest, do not blame the soil, or for that matter the air, for smut infection is not air-borne either.

Since the smut seeds are carried to the crop on the wheat grain, any "bunticide" that will destroy them without killing the wheat will result in a smut-free crop. But, in practice, the elimination of smut is not just quite so simple as it may seem at first sight, because of the difficulty of bringing the smut poison or deterrent in contact with every seed of smut, and because nothing can be used if the strength required to kill the smut materially affects the germination of the wheat.

Solutions of bluestone and of formalin have been in use as wheat pickles for many years, and the results obtained in practice are reasonably satisfactory. When properly applied, complete control of

the smut can be regularly secured. More recently, pickling by dusting the seed with one of several finely ground copper compounds has been found to be effective also. Every method has its advantages and disadvantages; some will prefer one method and some another. The particular pickle used is not so important as the method of pickling adopted.

Bluestone Pickle.

During the past few years the Department of Agriculture has thoroughly investigated the whole position, and its conclusions are based on the results of many carefully conducted experiments. Let us consider the use of bluestone first. The solution is correctly made up by dissolving bluestone at the rate of 1¼ lb. to every 10 gallons of water used. The bluestone should be weighed out and the water measured. Do not judge by colour. If the pickle is too weak, it will not kill the smut, if too strong serious injury may be done to the germination. The wheat should be immersed in the solution for three minutes, timed by a clock. The bags used should be turned inside out and pickled also. Fresh supplies of solution should be made up in the same way as the first. It is most important that every bag should be treated exactly alike.

Do not try to pickle a whole bag at a time. Break the bag into two or three "butts" and thoroughly rinse them up and down in the pickle. The object of doing this is to secure the displacement of bubbles of air, which hang in the creases and in the brush of some grains. If there are air bubbles present the pickle cannot get at the smut on portions of any grains protected. Better still than pickling in the bag is to pour the wheat into a perforated copper hopper, which is dipped into the solution. Then the wheat can be thoroughly stirred with a stick, and any smut balls, which always rise to the surface, may be removed.

Unbroken smut balls are not easily penetrated by pickles; the skin is very impervious, and the dense mass of tightly packed powder greasy. Hence the pickled wheat is liable to re-infection later by contact with the contents of the untreated smut balls. With bluestone this danger is considerably minimized, because the coating of bluestone on the grain largely protects it against re-infection. But such is not the case with formalin. Where that pickle is used, even greater care should be taken to skim off the smut balls.

The protection given the grain against re-infection is the principal advantage that can be claimed for bluestone. On the other hand, it interferes more seriously with germination than any other pickle. In tests conducted at Werribee during 1925 and 1926, wheat pickled with bluestone gave 15 per cent. lower germination than formalin, and at Rutherglen 13 per cent. What is worse, the speed of germination is retarded. Once unpickled wheat starts to sprout it generally all comes through the surface in three or four days. Wheat pickled with bluestone stakes twice as long. The disadvantage of this will be obvious in the case of wheat sown on land liable to surface caking, and for late sowing when speedy germination is of vital importance. Personally, I consider that these disadvantages outweigh any advantages that bluestone may have, and for those who prefer a wet pickle I strongly advise the use of formalin instead.

Formalin Solution.

The standard strength of formalin is 1 lb. of formalin to every 45 gallons of water. The time of immersion is also three minutes. As formalin does not prevent re-infection, really effective pickling can be done only by floating off the smut balls in the manner already described. Instead of a perforated hopper for this purpose, a compromise sometimes adopted is to roll back the mouth of the "butt," rinse it up and down in the solution, and then stand it on the bottom of the tub. If the wheat is then stirred, the smut balls float, and are skimmed off. At best, however, this is a cumbersome and imperfect substitute for the hopper.

Formalin when properly used is a very effective bunticide, and is easy to prepare. It does not kill nearly as much wheat as bluestone, but delays germination practically to the same extent. The average loss of germination in tests conducted over the past two years at Rutherglen and Werribee was 4 per cent., an amount hardly worth commenting upon.

Sowing Dry.

However, in some cases, but not in all, where seed pickled with formalin has been stored for some weeks before sowing, or where it has been sown on a dry seed-bed, a serious loss of germination has been noticed. The reason for this is imperfectly understood. It would appear that slow drying of the seed in bags crowded together somewhat, coupled with certain soil conditions, are contributing factors. For this reason, those sowing on a dry seed-bed are advised not to use formalin as a pickle, or on any occasion where the seed is not to be sown for a week or two. I agree that instances can be quoted where both these things have been done with impunity, but in other cases much loss has resulted.

The most common faults with wet methods of pickling are guessing the strengths and the time of immersion, and failure to eliminate the smut balls while pickling.

Dry Pickling.

There are a number of dry copper powders for pickling on the market. They vary in composition, but most of them appear to be satisfactory. The tests carried out by the Department show that the powder should be dusted on the wheat at the rate of 2 oz. a bushel. The whole of this quantity will rarely adhere to the grain, but it should be applied, and any surplus should be sieved off. A mechanical mixer should be used, and it should thoroughly and regularly coat every grain with powder. Some machines on the market do not do their work effectively. Buyers should see them in action before they make purchases. The tests conducted by the Department over a wide range of conditions show that for heavily smutted wheat copper powders are not quite so effective in killing smut as formalin, but for all ordinary purposes are most satisfactory.

Wheat pickled with copper powder germinates as well and as quickly as unpickled wheat. Indeed, the germination appears to be improved by about 2 per cent.—a result confirmed each year for the past three

years in many tests. Another advantage is that the wheat may be pickled months ahead of sowing, and, still another, that it may be used safely when sowing wheat on dry soil, as has been the case on many farms this year. A disadvantage is that the dust, when inhaled, irritates the mucous lining of the throat of some sensitive people. Any such persons should not use it. When used with ordinary care it is not injurious to health, despite inspired reports to the contrary. An excess of fine powder in the wheat clogs the drill. A proper sieving area in the machine and sowing through the "oat runs" of the drill will obviate this.

To sum up, it may be said that ball smut can be entirely controlled by proper pickling. There are three effective methods of pickling in common use. Each has advantages and disadvantages. Of the three, bluestone interferes most with the grain, and on soils where the germination is likely to be slow, or where the soil skins over, it should not be used.

Formalin is the most effective pickle for use where wheat to be sown is obviously heavily bunted; it kills little wheat, but delays germination. Do not use it for dry sowing. It is entirely satisfactory for ordinary use where soil conditions are good.

The powdered compounds of copper on the market control smut satisfactorily, except where the wheat is heavily bunted. The dust must be carefully and evenly applied. The germination is in no way depressed, and, indeed, appears slightly invigorated. The use of this type of pickle is rapidly extending, and should be employed in all cases of dry sowing, and has a very marked advantage where the conditions of germination are not first class.

ELMORE CROP AND FALLOW COMPETITION, 1926.

Report by the Judge—L. C. Bartels, B.Agr.Sc.

At judging time, towards the end of November, some excellent crops were inspected—as good as the best seen in other parts of the State this year. Good rains fell during 1926, but the absence of favorable spring rains must have reduced the yields. It was pleasing to notice how well most of the crops were finishing. This fact, taken with the general cleanliness of the crops, i.e., the absence of weeds and the purity of the varieties, the evenness, &c., shows that the Elmore farmers are progressing with the times, and are using the best cultural methods.

On the average the clay loams of the Elmore district are harder to manage than the self-mulching soils of the Wimmera, and the absence of spring rains made it rather difficult to reduce the fallows to a good tilth. In spite of that some of those in the competition had been well worked and were clean, with good conditioned mulches of dry soil over firm seed beds.

Most of the fallows were broken in July and August.

A feature of the crop exhibits at Elmore was the number of varieties of wheat included. For the most part they were pure, but in at least two instances good exhibits were spoiled because the varieties were badly mixed. This is a likely consequence of the handling of too many varieties with the facilities on the ordinary farm.

Most of the wheats now available are prolific, but the farmer who expects every new variety to outstrip the standard wheats is likely to be disappointed.

A farmer may with advantage have two or three wheats ripening at different times, and late maturing wheats should be sown first and early wheats last. Attention should be paid to the results of official variety tests, particularly the average after several tests.

The number of popular fancies in wheat varieties is sufficient evidence of variability of farmers' judgment.

Some of the crops at Elmore were badly affected with "foot rot." This disease was noticed on a previous visit three years ago, but it seemed more prevalent this year. As the name suggests, the affected wheat plant "rots" at the base of the stem, and lies down. The cause is a fungus which attacks the roots and the base of the stem. If the plant be inspected closely, it will show a brown discoloration. The method of control is, as suggested for the allied disease of take-all, a clean burn of the wheat stubble, growing clean crops of oats in rotation, careful fallowing, avoidance of dry working, and preparation and maintenance of a compact seed bed.

ELMORE CROP COMPETITION, 1926.

Name of Exhibitor.	Yield.	Purity.	Absence of Weeds.	Freedom from Disease.	Evenness.	Total.
Possible Points	**35**	**20**	**15**	**15**	**15**	**100**
L. Houlden	34	19	14	14	14	95
J. Read	34	18	13½	14	14½	94
D. Treweek (Free Gallipoli)	33	19	12½	14	14	92½
D. Treweek (Rance) ..	34	19	12½	14	13	92½
D. Adams (Dollar) ..	31	19	12	14	15	91
Herbert Holmberg ..	33	17	13	13½	13	89½
T. Dickens	29	19	13½	13½	13½	88½
D. Treweek (Federation) ..	30	19	12	14	13	88
D. Adams (Federation) ..	30	18	12½	14	13	87½
H. Ayson (Nizam) ..	26	19	14	14	14	87
H. Smith	26	19	14	14	13½	86½
H. Ayson (Graham) ..	30	14	14	14	14	86
D. Treweek (Rance) ..	28	19	13	12	13	85
Brown and Wright ..	29	19	10½	13½	13	85
Miss Jackson	27	19	13	14	12	85
D. Treweek (Federation) ..	35	10	13	14	13	85
D. J. Murphy (A) ..	29	19	12	11½	13	84½
Henry Holmberg ..	27	18	13	13½	13	84½
Weeks Bros.	23	18	14	13	13	81
Gavan Mackay	25	19	11	14	12	81
D. J. Murphy	25	19	12	12	12	80
J. H. Brown	23	18	11	13	13	78
P. Rasmussen	20	18	12	14	13	77

ELMORE FALLOW COMPETITION, 1926.

Name of Exhibitor.	Moisture.	Mulch.	Absence of Weeds.	Cultivation.	Total.
Possible Points	**25**	**25**	**25**	**25**	**10**
H. Ayson	22	24	24½	23	93½
G. Oaten	23	23	24	23	93
D. Crowe	23	24	24	22	93
D. J. Murphy (home paddock)	23	22½	24	22½	92
D. J. Murphy (Carmody's)	22	22	23	23	90
P. Rasmussen	23	22	22	23	90
H. Holmberg (B Exhibit) ..	21	23	22½	22	88½
H. Holmberg (A Exhibit) ..	21	23	21½	22	87½
D. Treweek (home paddock)	20	21	24	22	87
G. Mackay	22	22	23	20	87
L. Strawhorn	23	20	20	21	84
D. Adams	20½	20½	21	21	83
Alf. Dobell	23	17	24	19	83
D. Treweek (Hunter) ..	21	19	24	18	82
Weeks Bros.	23	19	22	18	82
J. Wright	21	17	21	18	77

Mr. L. Houlden, who was awarded first place in the crop competition, presented a remarkably good exhibit of Graham wheat, which was tall, upstanding, regular and dense, with practically no weed growth. It had been well drilled, and only a trace of disease showed.

For purity, regularity, and freedom from weeds, this crop sets a high standard. The seed was obtained from Mr. D. J. Murphy. Graham is a late maturing wheat, but this crop was finishing with a good reserve of energy, and the condition may be correlated with the cultural methods adopted. Mr. Houlden made a rotation of wheat, oats, pasture, bare fallow, wheat. He made an early fallow, having broken the land with a disc plough in May, 1925, to a depth of 4 inches. He harrowed in August, and again in September. The land was scarified in November, and left till March, when it was scarified after rain. The seed was sown with a Combine at the end of April and beginning of May. It was formalin-pickled, and was put in at the rate of 70 lb. Manure was applied at 112 lb. per acre, and in this regard Mr. Houlden was in advance of all other contestants—most of whom used about 90 lb. per acre.

Mr. Jonah Read had a beautiful crop of Federation wheat, which was level, tall, and well-headed. It was relatively free from weeds, although some thistles were noticed. The variety included some "strangers," and a little flag smut was in evidence. It was regularly drilled. In preparation for the crop the land was fallowed in the beginning of August, and broken down with the tiger harrows. In January, it was tiger-harrowed after rain. After March rains, it was harrowed, Wimmera-scarified, and cultivated. The crop was sown at the end of April—60 lb. seed, 90 lb. manure. It was fed off at the end of June.

Mr. D. Treweek occupied third place with a crop of Free Gallipoli, and fourth place with Rance. His exhibits deserve mention, because

he had five entries, all of which were of high standard. The Free Gallipoli was sown in July, on fallow which followed oats in 1924. It was seeded in the middle of May—75 lb. of seed and 90 lb. of manure. It was a very nice upstanding crop, but it was marred by the presence of some wild oats.

The Ranee was on ground which bore a crop of wheat in 1923, but it was lea ground for eighteen months, and was ploughed for fallow in June, 1925. This crop was very dense in part. It was tall and fairly clean, but some wild oats showed throughout. It was sown at the beginning of May—75 lb. of formalin-pickled seed with 82 lb. of manure.

Mr. Ayson's fallow made a splendid exhibit. The surface was a bit lumpy in parts, and the mulch on the deep side, but it was very clean. The seed-bed had a good moisture content.

Last year the paddock was in oats after wheat. It was ploughed 5 inches deep in June and July with the mouldboard plough, harrowed and spring-cultivated twice in October, and scarified at the beginning of November.

Mr. G. Oaten ploughed his fallow in July with a mouldboard plough 4 inches deep. It was scarified immediately afterwards. In October, it was harrowed after rain, and it was scarified again after rain at the end of October. This left the surface ridged, but the seed bed was fairly level, and it had a good moisture content. The mulch was a little too deep.

THE SITE FOR AN ORCHARD,

ITS SELECTION AND PREPARATION.

By H. W. Davey, Chief Orchard Supervisor.

Selection of the Site.

The site for an orchard can be chosen from a wide range of country. The principal fruit areas of Victoria in irrigation areas are—the Goulburn Valley, Nyah, Tresco, Bamawm and Rochester districts, Horsham, Quantong, and Bacchus Marsh, all of which are supplied with water by the State Rivers and Water Supply Commission. Mildura with its sandy loams is irrigated by water pumped from the Murray River. Portland is a centre with great possibilities in the growing of deciduous fruit trees, having the advantages of good low-priced land, timber at hand for cases, and shipping facilities, either for exporting fruit to Europe or sending it to inter-state markets. The Bendigo district, including Harcourt, Castlemaine, and other parts of that locality, is also eminently suited for growing fruit of the finest quality, and in many parts of that district water is available for irrigating the trees. The Mornington Peninsula includes such well-known fruit centres as Somerville, Tyabb, Hastings, and Red Hill.

Geelong, along the Moorabool, Leigh, and Barwon Valleys, is also well and favorably known for the excellent quality of the fruit produced there. Gippsland, North-East Victoria, and Amphitheatre, in the Central District, have many excellent orchard areas. Apart from the principal fruit-growing centres, many orchards are to be found in various other parts of the State.

SOILS.

The principal fruit soils of Victoria range from light sandy loams and granitic grey loams to alluvial and volcanic soils. The most desirable characteristic in a site is moderate fertility, with good drainage soil of sound physical condition overlying a good friable clay.

A light sandy soil, although easy to work, is not the most desirable in other respects, as in such soils it is often difficult to keep up the supply of humus. Humus may be defined as organic matter (usually vegetable) in such an advanced state of decay as to have lost its original physical identity, and it is the presence of humus that gives life to the soil, for its fertility depends largely on its humic content.

Even with the benefit of green crops turned under, it is difficult to keep light sandy soils supplied with humus, for, owing to the sand becoming so hot during the summer months, the humus is easily burnt out. These soils, in addition, often have a layer of very fine sand overlying the sub-soil, which becomes like porridge in wet winters, and then in summer sets like cement.

Granitic soils are usually very suitable for fruit trees. They are easily worked and are mostly of a fertile character, producing good trees capable of bearing abundant crops, of high quality and colour. An undesirable feature is that in parts of the orchard the granite may come too close to the surface, consequently the soil dries out easily during the summer months, and is too shallow for the roots.

The grey loam soils are usually excellent for deciduous fruit trees. The general characteristics of these are good water-holding capacity and fair fertility, and usually they overlie a good friable clay sub-soil. Even in these soils, however, tile drainage is often necessary. Alluvial soils are usually deep and fertile, easily worked, having good natural drainage. There the trees grow to a large size, bearing fruit of good quality. The drawback to such a soil is that, owing to the vigour of the trees, they are inclined to be late in coming into bearing. In this class of land, the loss of moisture is often great, owing to the perfect drainage and nature of the soil. Volcanic soils are fertile and deep, and trees growing on them produce excellent fruit; but often, owing to depth of the sub-soil, the soil dries out rapidly. Further, the trees are liable to attack from the root-rot fungus—*Armillaria mellea.*

Basaltic soils should be avoided for fruit growing.

OTHER CONSIDERATIONS.

In making a choice of land for an orchard, the prospective grower should first decide on the class of fruit he intends to grow. If oranges, he will find the most suitable soils and climate in the northern irrigated areas. Lemons have a much wider range, and can be successfully grown in most parts of Victoria.

Soft fruits for dessert purposes are better grown close to markets, so that they may reach the consumer in perfect condition; if they have to be transported great distances they will have to be picked in a more or less immature condition, with subsequent loss of flavour. But, irrespective of the class of fruit one intends growing, he must first assure himself that the land to be planted has a sufficient rainfall, unless irrigation water be available.

Another factor is accessibility to railways and markets. There are many parts of the State eminently suited for the growing of deciduous fruit trees, but, unfortunately, the state of the roads there often makes transport difficult. Distance from the railway is not so important as formerly, owing to the advent of the motor truck, provided roads be suitable for motor traction.

Another thing that must not be overlooked is the supply of trained labour. In a fruit-growing centre, skilled workers for pruning, cultivation, spraying, picking, and packing are usually available, but for an isolated orchard the orchardist may experience difficulty in securing the right class of skilled labour at the right time. This, in the case of, say, spraying, or harvesting ripening apricots, may mean a very serious loss.

For an orchard site an eastern or north-eastern slope is to be preferred; the gradient should not be too steep, as this, where soils are light, allows erosion to take place, and in any case makes the working of the orchard more difficult. What is required is sufficient slope for draining away surplus water, and also to supply air drainage to minimize frosts.

It is desirable that orchards should be protected from westerly and south-westerly winds by rising ground, forest land, or other breakwinds. Where there are no natural windbreaks, trees to act on such should be planted at the same time as the orchard.

Preparation of the Land.

The proper preparation of the soil before planting is of the very greatest importance, for, although trees will live and grow in ill-prepared land, they are usually unthrifty in their growth.

In the first place, all timber should be grubbed out, and all roots run to a depth of at least 2 feet, no matter whether these be dead or alive, because any roots left in the ground often become the host of the root-killing fungus, *Armillaria mellea*—one of the facultative fungi—a class able to live on wood, either as a parasite or as a saprophyte.

All grubbed timber that has no marketable value and all roots should be burnt on the spot.

The land should then be securely fenced. Where there are hares or rabbits, it should be wire-netted, otherwise the young fruit trees may be completely destroyed.

Subsoiling will be of great benefit in the future to the trees, but care must be taken not to bring the subsoil to the surface. The land, after it has received its first ploughing, should be left in the rough through the summer months. In the autumn it should be again ploughed, and then cross-ploughed, and worked down to a fine tilth before the trees are planted.

In the majority of orchard soils, underground drainage is necessary, and with properly laid tile drains the health of the trees will be greatly improved.

In the first place, lowering the water table gives a greater depth of congenial soil conditions for the roots. Surplus soil water is also quickly removed, thus preventing the land from lying cold and inert while the water is getting away. The roots also function earlier in spring on drained land, owing to the soil temperature being higher, thus allowing cultivation to be completed much sooner, without the danger of compacting the soils, as would be the case on undrained land.

Tile-drained land is drier in winter and moister in summer than is the case with soils that are waterlogged during the winter months; the latter usually become extremely dry during the summer.

There is also the biological aspect to consider, especially so where leguminous crops are to be ploughed under for green manure.

Planting.

In measuring off the rows, previous to planting the trees, great care should always be taken to see that all measurements are correct. Deciduous trees, with the exception of walnuts, are usually planted 20 feet apart on the square system; this, besides making the orchard pleasant to the eye, also makes cultural operations, spraying, irrigation, &c., much easier than where trees are not in perfectly straight lines.

The measuring off of the rows the trees are to occupy is usually done by means of a planting wire, marked off with pieces of copper wire soldered on at every 20 feet, or at whatever distance apart it is intended to plant the trees. Care must also be taken to provide sufficient space between the fence and the outside row of trees, so as to allow room for a windbreak of trees to be planted, if such be necessary; in any case, the first row of trees should never be planted less than 20 feet away from the fence, as sufficient room should always be left in the headlands to allow horse-drawn implements or motor vehicles to turn easily.

If the fences are at right angles to each other, the laying-off of the rows will be greatly facilitated, but, failing this, a right angle can easily be obtained by means of what is commonly known as the 3-4-5 principle.

Preparation of Irrigable Land.

On irrigable land attention should be paid to selecting the higher parts for planting the early ripening varieties, as these require fewer waterings than trees whose fruits mature much later in the season.

In orchards where irrigation is to be practised, grading or levelling the land is one of the most necessary operations.

Where depressions occur, it will be found, on the first application of water, that these hollows become flooded, often to the detriment of the trees, as some, of course, will receive too much. When the irrigation furrows pass over these depressions, it becomes difficult to confine the water to the furrows, breaks-aways often occurring.

The result is that parts of the orchard receive an excess of water, the land dries out unevenly, and the important work of cultivation is held up.

It can be safely stated that any extra care taken in the selection and preparation of land is time and money well spent.

PROPAGATION AND SELECTION OF FRUIT TREES.

By J. M. Ward, Superintendent of Horticulture.

If we are to bring about an improvement in the quality of fruit tree to be planted in the future, it is essential that the questions of selection and propagation should receive the very serious consideration of both the fruit-grower and the fruit tree nurseryman. The average commercial fruit-grower does not, unfortunately, give sufficiently deep thought to the subject of tree selection or the individual yield of each tree in his orchard. He plants his trees with a view to inducing each individual tree to produce the maximum amount of marketable fruit at a minimum of labour and cost. To obtain this result a great deal, of course, depends upon the attention given the tree during its life. Under good management excellent results may be achieved; poor or inefficient management may mean whole or partial failure. But even under the most efficient management a good start is absolutely essential, and it follows then that only trees of good breeding should be planted. This cannot be obtained without study and labour.

At this juncture it may be well to give a brief outline of the raising or propagation of fruit trees. The majority of apple trees in Australian nurseries are raised by the following method:—Northern Spy—a variety of apple. Stock or young trees of this variety are planted in nursery rows, and cut down to the surface level of the soil; during the spring and summer this stock sends forth new growth. A few inches of soil is then heaped up around the new growth. This induces roots to grow from what would naturally be the aerial portion of the plant. When the growth in question is large enough it is taken from the parent plant during the dormant season, and put out in nursery rows, where the bud of the variety required is worked upon it. This becomes the future tree. This stock plant is usually referred to as a "stool."

Another way of producing the apple stock is by grafting portion of the upper part of the Northern Spy on to a few inches of root of the same variety. The scion or grafted part, after planting out, then throws out roots, which become the future main roots of the tree. The bud or scion of the desired variety is then worked onto this stock, which is in reality a "cutting," just the same as the stock from the stool is a "sucker." These suckers, as they grow, are removed year after year from the parent plant, and naturally enough, as the stool becomes aged, the suckers cannot have the same vitality as the first-removed had, and therefore must necessarily be weaker and less able to withstand the many trials that are required of the apple tree. This, to some extent, may explain why many apple trees are not yielding the good average crops they formerly did. There are other reasons, too. Most of the old-established and best apple trees in Tasmanian orchards were propagated by budding or grafting the required variety on to a stock produced direct from a seed, thus new life was created naturally having greater vigour and more vitality.

Pear and plum trees were at one time propagated by sowing the seed of vigorous growing kinds, then working the variety required directly on to the seedling about a year later. During the past few

years, however, there has been a tendency to raise pear and plum stocks from cuttings, and then bud or graft with the required kind. From the writer's knowledge of fruit trees and their habits, it is anticipated that we will have many problems to solve in the future as the result of getting too far away from nature. We should, as far as it is possible and practical, keep to the stock raised from seedlings, not overlooking the fact that careful thought and attention are necessary in making a selection of type and variety most suitable for the purpose.

Apricots and peaches are worked directly on to seedling stock, so also are citrus fruits. Reference to citrus stock brings to mind the much-debated question, "What is the best stock to use for oranges—lemon, sweet orange, or sour orange stock?" As with other fruit tree stocks, little or no scientific investigation has been made in Australia on this very important subject. But, from laboratory tests made and field knowledge of the question, Victorian departmental officers have every reason to believe that the sour or Seville orange stock suits our conditions better than the lemon stock.

From a nurseryman's or propagator's point of view, the lemon is the best stock to work, as the buds "take" much more easily on the lemon than they do on the sour stock. In other words, it does not require the same skill to bud lemon as it does to bud sour orange stock. This is the reason why the majority of our orange trees are worked upon lemon stock.

Whilst the importance of having the right type and variety of stock cannot be overlooked, another very important matter is the selection of the right type of bud or graft. Though many of us may not agree upon what is the best class of stock to use—through lack of knowledge based upon scientific investigation—the necessity for selecting buds from trees that have proved themselves to be profitable producers of high quality fruits must be recognized by all. Every citrus grower is well aware that he can pick quite a number of types of fruit from almost any tree in his grove. Some are poor, some indifferent, and some are excellent types of fruit. With a little care on the part of the grower, every tree would produce the good type in payable quantities. If, however, the wrong type of tree is planted, poor or indifferent fruit must result.

The selection of the correct kind and type of tree opens up a very wide and important subject. Unfortunately, in Australia this subject does not receive the attention it deserves. There are two sets of people responsible for the lack of interest displayed in the selection of the correct type and strain of fruit trees. One is the nurseryman who propagates trees to sell, and the other is the fruit-grower who plants trees for the fruit they produce. Apparently, neither party has given serious consideration to the productive value of each tree. Every tree that is planted in an orchard is put there for a definite purpose—to yield each year an amount of fruit that will return not only the cost of its upkeep and interest on capital, but a margin of profit for the grower. Unless each tree will do this, it should not have a place in the orchard. A fruit-grower who keeps a non-profitable tree in his orchard can be compared with a dairyman who keeps a dry cow all the year round.

Having this in mind, the planter should insist upon the nurseryman supplying him with a tree having a good rooting system, on to which

is worked a bud or scion taken from a tree that is known to be healthy, vigorous growing, and producing good crops of the correct type of fruit each year. In other words, each tree should be a pedigreed one, and the orchardist should follow the example of the successful dairyman who carefully tests each cow in his herd, and gradually eliminates the "duds." In this, however, the dairyman is the selector, whereas the orchardist depends upon the nurseryman to provide him with his trees. If the planter insisted upon the nurseryman supplying the pedigree of the trees sold him, particularly in the case of citrus trees, the productive results per orchard would be infinitely greater. In supplying the pedigree of the tree, the kind of stock the bud or scion is worked upon, how it was propagated—i.e., from seed, sucker, or cutting —from where the buds or scions were obtained, and the type and productivity of fruit and tree, should be stated. In this respect closer co-operation of the nurseryman and the grower is necessary.

In this connexion reference might be made to the splendid work conducted by Professor A. D. Shamel and his associates at Riverside, Southern California, in regard to the selection of the right type and strain of budwood for the propagation of oranges and lemons; also for top-working of "dud" trees with buds carefully selected from trees producing heavy crops of the type of fruit required. There, where a "dud" or poor producing tree is discovered in an orchard, it is cut down and top-worked to a better and more productive kind. So very important has this work become in California that the Citrus Fruit Exchange (a most successful co-operative body) has formed a separate company for the purpose of selecting and supplying buds to shareholders of the various citrus co-operative companies. The writer came in contact with a nurseryman in Watsonville, California, who was paying a high yearly rental for the right of cutting budwood from twelve apricot trees which annually produced heavy crops of magnificent fruit. All his apricot trees were propagated from buds selected from these twelve trees. I inspected the trees and also full-bearing orchards (with crops on) propagated from the buds in question, and was more than satisfied with the results.

A large fruit-grower from the Goulburn Valley some time ago informed me that for several years he had grown his own trees, worked from carefully selected buds. This has resulted in his orchard averaging him nearly 10 tons of peaches per acre per annum, whilst the average for the Goulburn Valley is less than 4 tons per acre per annum. The foregoing shows how necessary it is to secure and plant the right class of tree, but this will not be done unless the grower insists upon it, and takes greater interest in this class of work. It is desirable, therefore, that both the orchardist and the nurseryman should have this matter placed before them at frequent intervals, and until a real and practical start is made to bring about an improvement. Any move for betterment must emanate from the fruit-grower, as he has the most at stake.

To raise a tree for quick sale is one thing, but to plant, cultivate, and tend a tree to cause it to produce profitable crops over a long period of years is a totally different proposition. This is the orchardist's side of the question, and should receive more and deeper thought than it does at present.

THE CULTIVATION OF WINTER FLOWERS.

By Geo. Russ, Demonstrator in Horticulture, School of Primary Agriculture and Horticulture, Burnley.

During the months of May, June, July, and August cut flowers are very scarce around Melbourne. The ground is then cold, and the weather usually wet; consequently growth is slow.

There are two methods by which blooms may be obtained during these winter months. One way is to extend the normal flowering season of some of the latter summer and autumn-flowering plants, such as dahlias and chrysanthemums.

If the flowers of Star and Pompone dahlias are kept well picked and not at any time allowed to form seed heads, the plants will bloom until May and June. Melbourne Star, a Star dahlia raised by the late Mr. J. Cronin, and such Pompone varieties as Electra, Nora Reynold, Barbara Purvis, and Dewdrop will bloom until the end of May.

Usually in the gardens around Melbourne these dahlias are lightly cut, and the flowers are allowed to become mature before they are gathered, with the ultimate result that frequently the bushes finish blooming by the end of April. It is advisable to always cut the Star dahlias before the pollen shows. Cut them freely and heavily, and do not permit any old stems to remain after they have finished flowering.

Some chrysanthemums naturally flower late in the season; among these are the varieties Lilian and Ruby Jones. Ruby Jones is one of the best for late autumn cut flowers and very suitable for indoor decoration. It is almost old gold in colour, yet very brilliant. The flowers do not droop, but are carried on straight stiff stems, and commercially they will sell before any other chrysanthemums of this shade.

The other method of obtaining winter flowers is to grow plants which in their native country bloom through the winter or very early spring. In our country such flowers as Iris stylosa and Iceland poppies will flower right through the winter.

Iris Stylosa.

Iris stylosa is a small lavender iris which blooms right through the winter. It is one of the most useful winter flowering plants, starting to flower as early as the middle of April, and blooming right on till the end of August. The flowers should be gathered (every morning, if possible) just as they begin to show colour in the bud stage. If picked then they will last in water for nearly a week.

The iris stylosa should be planted in a good open position; along the side of a path in the flower or vegetable garden would be an excellent place. When planted in such a position they serve as a very good border. At the Burnley Gardens there is a border of about 50 yards of these plants growing along the top edge of a stone wall and embankment, and there they are doing remarkably well.

They should be divided up after flowering if they become too crowded. It is not advisable to disturb the clumps for three or four

years, and then only one-half at a time. Then one would be sure of getting flowers from the undisturbed plants; it is possible the others may not flower the year after disturbing them. About the end of February all the foliage should be cut off to about an inch from the crowns; at the same time the stems should be given a good dusting of air-slaked lime. This will help to keep away slugs and snails, which otherwise may spoil a large number of the buds.

PRIMULA MALACOIDES.

This is another good winter flower for house and garden decoration. The seed should be sown early in December in a well-sheltered corner, or in a well drained box or pan, and under glass if possible. Failing glass, a canvas frame will do. As soon as the plants are large enough to handle they should be picked off into boxes until large enough to plant out in the garden. The seed should be cast thinly right on the surface of the soil. Primulas grown in pots are nice plants for inside decoration, but they must be kept well watered. They like a sheltered position, although I have seen them doing very well right out in the open; then, however, they must be planted in well drained land. The flowers are good for house and table decoration; they will last for a week in water. A little lime dusted through the plants will be beneficial, and will help to keep the slugs away.

MIGNONETTE.

This is on of the old favorites. The seeds should be sown in clumps or in drills in the open ground about the end of December. If a succession of flowers is needed then further sowings must be made. Mignonette likes a rich sandy loam on the moist side, but not wet. The seed should be sown rather thickly, and when the plants are large enough they should be thinned out to 6 or 8 inches apart. The mignonette plant cannot be raised by transplanting. The ground should be well manured, and the manure dug in deeply. The seeds should be sown on the surface, and just sufficient fine soil raked lightly over to cover them.

When mignonette seeds and other fine flower seeds are sown in the open it is well to put on the plots a little stable manure that has been run through a half-inch sieve. This will prevent the surface from becoming caked.

THE VIOLET.

The violet is another old favorite that should find a place in every garden. To get the best results the plants should be planted right out in the open where they will get plenty of sunlight, but not under trees and shrubs, as we often see them in gardens. Some gardeners seem to think that the violet can be put in anywhere, and needs no attention. This is a mistake. If good blooms are to be obtained the violet must have as much attention as any other flowering plant. To grow them successfully they must be replanted every two years, when growing in heavy soil, and every year when growing in light sandy soils. The best time to plant violets is in July and August. Divide the plants up, cut off most of the foliage; plant them firmly and then water them in. Keep the ground open with the Dutch hoe,

and see that they do not want for water. The soil should be fairly rich; by that I mean it should have been well manured with decayed manure dug in deeply a month or six weeks previously. The varieties mostly grown are single—Princess of Wales, California, Italia. Double—Marie Louise, Mrs. J. J. Aster, Count Brazza.

The Carnation.

In order to produce winter blooms, carnations require a good open and well-drained position. Any ordinary garden soil can be worked up to suit them. The beds should be thrown up about 6 inches above the path. A soil of a good loamy nature with a fair amount of sand and grit in it to keep it open is the best. Young carnations do not like fresh manure; therefore it should be dug in deeply, so that the roots of the young plants will not come in contact with it. The ground should be allowed to settle down before planting. If there be a deficiency of lime some should be dusted on the soil and hoed in, but lime and manure must not be added at the same time. The best time to plant out is September and October. Keep all the flower buds picked off until the end of February, and then let the blooms develop. Carnations must not be planted deeply (just to the first pair of leaves), but they should be planted firmly. Some of the best varieties for winter are—Salamander, Enchantress, Denet, Mona, Highfield Beauty, Peach Blossom, Washington, Poulter's White, or White Perfection.

Winter-Flowering Sweet Peas.

Where conditions are favorable, winter-flowering sweet peas will bloom continuously for four or five months, provided the flowers are picked as they open.

In growing them the main thing to consider is position. The plots should be well drained, and sheltered on at least two sides. They do not like the south winds. The ground should be thoroughly trenched to the depth of at least 18 inches or 2 feet, so as to allow the roots to go down, for the sweet pea plant is a great feeder. The seeds should be sown in a drill about 1½ inches deep, and from 2 to 4 inches apart along a fence about 8 feet high. At times I have seen them growing well over an 8-ft. fence.

Very often the seed is chipped or filed before planting, and some people soak it in cold water over night. I have never chipped or soaked the seed, and have had good results by giving the drill a good soaking with water and mulching it over with sifted stable manure.

The young plants should show in from twelve to fourteen days, When coming through the ground they should be protected from birds. A good protection is to run some strings of cotton above them.

Time of sowing is from January until the end of March. The plants should be kept well watered. Wire netting (2 to 4-inch mesh) fixed to a paling fence is a very suitable support, but whatever support is used it should be not less than 6 feet high. The plants should begin to flower ten to twelve weeks after the sowing of the seed. As a rule the first flowers are small and should be removed. Keep the plants free from weeds, and as they get stronger they should be watered with

liquid manure once a week. The following varieties are good:—Marie Cheslyn, Mrs. May Hassett, Countess Improved, Albury Beauty, Winsome, Champagne, Concord Chief, General Joffre, Albury Carmine, Daisie Motte, and Motte's Crimson.

Iceland Poppies.

Iceland poppies are among the most useful flowers we have. For garden and house decoration and for winter flowers they cannot be surpassed. There is a great variety of colours—deep orange, yellow, pink, white, &c.

For very early blooms the seed should be sown from the third week in November and the beginning of December, and to keep the standard of flowers good another sowing should be made in January and February. About six to eight weeks after sowing, the seedlings should be ready to plant out into the permanent bed. To get the most picturesque result in the garden they should be given a plot by themselves. This may be said of most garden flowers. Iceland poppies thrive best in an open, well-drained position. It is not advisable to plant them in the same land two years in succession.

General.

I always sow fine seeds outside in a good warm position. In hot weather I shade the seedlings with a hessian cover; this is removed at night and during dull days; otherwise the plants well become too spindly.

To prevent the soil from caking I put a fine covering of sifted stable manure over the surface where the seeds have been sown.

There are, of course, many other beautiful winter-flowering plants, but the few mentioned have been chosen because their blooms appeal to all lovers of flowers.

POULTRY PARASITES.

A Wireless Talk by H. F. Clinton, Assistant Poultry Expert (Broadcast through 3LO).

The famous professor had attained some portion of his distinction by reason of years of work spent upon a small and little-studied group of insects. His wife and small daughter chanced into his laboratory one day, and discovered a student examining one of these insects through a microscope. The daughter demanded a look, and there soon followed the inevitable question, "What is that?" "That," said the unsophisticated student, "is a louse." There was a moment of pained silence, and then came the gentle but unmistakable rebuke from the professor's wife, "We always call them anoplura."

After all there *is* something in the name by which a thing is called. Even the soldier, from whom one would least expect any delicacy in such matters, conceals the identity of these insects under the euphemistic titles of "seam squirrels," "cooties," and "greybacks." That the names thus accorded them reduces the frequency or the painfulness of their attentions may be doubted, but at least the victim is enabled thereby to retain rather more of his self-respect. In fact, under the name of "cooties" these insects may quite properly become a subject even of parlour conversation.

Now, these very insects, as well as a few others, are the subject of my present talk.

Before proceeding further with the detailed descriptions of some of the more common poultry parasites, a few words of advice may be given.

The aim of every poultry-keeper should be to manage his birds so as to prevent entirely, or at any rate to reduce to a minimum, the occurrence of these pests. If they are destroyed ere they have got a firm hold, much trouble will be saved. Therefore, every one beginning poultry-farming should try to make himself familiar with the life histories and habits of any vermin likely to be met with. This information can be obtained from Bulletin No. 54, published by the Department of Agriculture, a copy of which can be had free upon application.

As a first step to guard against parasites, it is necessary for the breeding stock to be sound and vigorous; their food should be ample and wholesome, and the fowl-houses absolutely clean.

Parasites cause irritation to the birds, and this, of course, has a detrimental effect on the nervous system, which in turn retards growth, interferes with sleep and the general health of the birds. In this weak condition they are liable to many ailments, egg production is reduced considerably, and the flesh of table birds becomes poor in quality.

Lice.

Of lice, as I shall not hesitate henceforth to call them, it should be explained that there are really two different kinds. One sort, known as bird lice or the biting lice, is found chiefly on birds, although there are a few species that live on mammals; all the species of the other sort, the blood-sucking lice, occur on mammals.

There is a very great difference in the manner in which the species of these two groups obtain their food. The biting lice feed by biting off bits of hair, or feathers, or skin scales, while the blood-sucking lice obtain their food by inserting their beaks through the skin and sucking up the blood of their host.

All lice found on poultry belong to the biting class. They live permanently on the birds, although occasionally some may be seen on the roosts and in the nest boxes. They do not go through a complete change of form like a butterfly or moth. Eggs are laid on the feathers of any poultry, and in from seven to ten days the young emerge. They are similar to the adult, but very small. The period required for full development from the time the egg is laid is from sixteen to twenty days. Breathing takes place through a series of small holes in the body of the insect, and not through the mouth. Under the microscope respiratory or breathing tubes can be seen connected to these holes all through the body.

There are about twenty different species of lice found on domesticated poultry, varying in length from one-sixteenth to one-eighth of an inch, and, with the exception of the head louse, all can be treated in the same way. But it should always be remembered that prevention is better than cure.

The best and most natural way of keeping these parasites in check is to provide a dust-bath for the birds. A portion of the shed or yard should be boarded up about a foot high, and supplied with fine dust. The fine dust particles enter the breathing holes of the insects, killing them by suffocation. Wood ashes and sand will keep the dust-bath loose; the use of flowers of sulphur in addition is often recommended. Individual birds that are badly infested may be dusted with a good insect powder.

The head louse of chickens and fowls causes a great deal of trouble at times. The best treatment is to give the bird a dressing of some non-irritating oil, such as olive oil. Apply with a rag, taking care that the insects are well covered.

Red Mite.

This is the worst and most persistent pest that the poultry-keeper has to contend with. The adult female is a little less than one-twenty-fifth of an inch long, grey in colour with dark markings, and when engorged with blood shows a red colour through the skin. They are often called lice by poultry-keepers, but the louse is a true insect, and differs from the red mite in having the head, thorax, and abdomen distinctly marked off, and in having three pairs of legs, while the red mite has four pairs of legs in the adult stage, and its head, thorax, and abdomen are fused into one piece. The mouth parts are adapted for sucking the blood of the birds. In appearance it is something like a very small spider.

The red mites attack the birds at night, and remain concealed during the day time in cracks and crevices of the perches, nests, and houses. They cause considerable irritation and consequent loss of sleep. Although not hard to kill, great difficulty is often experienced in getting at the mites' hiding places, so that an endeavour should be made to have sheds and perches as free from cracks and crevices as possible.

The eggs of the red mite measure about one-sixtieth of an inch long; they hatch out in about five days. The young mites may live for quite a long time on any kind of filth.

Spraying should be well done with a good penetrating fine mist spray; chloride of lime, 6 to 8 oz. to the gallon of water, is suitable for the purpose, or any other good disinfectant may be used. The perches can be painted with tar to fill up any cracks, and the joinings treated at intervals with tar oil or kerosene. Cleanliness and plenty of sunlight are especially antagonistic to the mites. In order to ensure continued freedom from this pest, control measures should be repeated three times, at intervals of about ten days.

Scaly Leg Mites.

The scales on the legs of poultry, which are of a reptilian character, lend themselves admirably to the introduction of the mites, which work their way underneath, and there they live and multiply. The complaint is really leg mange; if neglected it will ultimately cause lameness and great pain to the birds. The mites burrow into the leg, casting out the debris, and form galleries. Rough crusts are formed, and gradually the legs present a deformed appearance. Leg mange is first manifested by a white powdery substance, which elevates the scales. The mites are almost invisible to the naked eye, the female measuring only about one-seventieth of an inch long, while the eggs measure only one-eight-hundredth of an inch long.

The rapidity with which these mites breed is very great. It has been estimated that one female will produce in her sub-epidermic gallery about fifteen individuals, and that after 90 days there may be 1,500,000 descendants, constituting the sixth generation. They are readily transferred from one bird to another, and prompt treatment is imperative.

In bad cases the crusts may be softened by soaking in warm soapy water, and the dirt and loose scales removed by scrubbing with a nail brush, care being taken that bleeding does not occur. An ointment consisting of sulphur mixed with fat, lard, or vaseline, or any good disinfectant should be applied, and the treatment repeated in a week's time. This should effect a gradual cure. In mild cases it would be sufficient to paint the legs and feet with the mixture, or dip them into the solution. Kerosene is liable to taint the eggs, and is rather severe on the birds, and cannot be recommended.

Depluming Scabies.

The depluming mite is closely related to the scaly-leg mite, and attacks the bird at the base of the feathers. The complaint is accompanied by the production of an abundance of epidermic scales, irritation, and itching, which compel the fowl to pluck at the feathers. These easily drop out or are broken off, leaving a bald or partly denuded skin. From these parts it spreads to adjacent regions of the body. Affected birds should be isolated and given a dressing of sulphur ointment around the affected parts and also a little distance beyond the bare parts.

Poultry Tick.

Poultry tick is a very serious and troublesome pest in some of the warmer parts of the State. The Quarantine Act requires that all outbreaks be reported to the Chief Veterinary Inspector, Department of Agriculture. It is somewhat similar in habits to the bed bug. The adult hides in the crevices and cracks of the houses and perches during the day time, visiting the birds at night in order to suck blood. They are found in all stages, from the newly hatched larva, measuring about one-thirty-second of an inch long, up to the adult tick, which sometimes reaches a length of one-third of an inch. They are oval in shape, flattened with thin margins, pitted on the upper surface, and grey-brown to blue-black in colour. They have no eyes. The eggs hatch out in about three to four weeks, and the newly hatched larvae attack the birds, and remain attached to the skin for about five days. They then seek the crevices of the houses and perches. The larvae moult in about a week after hatching, and the fourth pair of legs appears behind the third pair. From the time of hatching three moults take place, and they reach the adult stage in about 30 days. In the adult stage they visit the birds nightly, and take about 20 to 45 minutes to become fully engorged with blood.

Poultry tick are very tenacious of life, and have been known to live several years without food. They are responsible for the transmission of spirochaetosis, or tick fever, in poultry, the organisms being introduced into the blood of the host when the tick are feeding on the bird.

When the presence of the tick is suspected, a thorough inspection should be made under the perches, &c., and the blade of a knife or chisel passed between the cracks or crevices; if any tick be present the blade will come out smeared with blood.

In tick-infested areas all poultry houses should be constructed of iron, with the woodwork on the outside if possible, or, better still, angle- and tee-iron should be used in its place. They should be built away from any other structure. Pepper trees, with their loose bark, have been found to harbour large numbers of these pests. When tick have once been found in old houses, it is best to burn them down, and a start made on another part of the farm on new ground, with new houses and clean stock. The ground on which the old structure stood should be saturated with kerosene.

Round Worms.

Round worms are found in the crop, gizzard, intestines, and caeca. They affect the digestive organs, and if in numbers, a stoppage may take place in the intestines. They are white in colour, and vary in length from about one-third of an inch to five inches. Their eggs are laid within the bird, and pass to the ground, and are picked up by fowls, which in turn become infected.

The presence of the worms is indicated by dullness, half-closed eyes, emaciated and weak condition, and an indisposition to move about; the feathers become erect and lustreless, and the wings drop. Prevention should be aimed at by thorough and frequent cleaning up of droppings, by burning the litter, and by spraying the ground of the houses

and runs with a solution of chloride of lime (6 oz. to the gallon of water), or by a liberal application of any other good disinfectant.

A good general treatment is to give adult birds Epsom salts in the mash at the rate of 1 oz. to twelve birds; for smaller birds, at the rate of 1 oz. to twenty birds, and for chickens of from six to eight weeks old 1 oz. to fifty birds. This treatment can be repeated three times at intervals of six days. The feeding of onions at the rate of three-quarters of an ounce to the adult bird three times a week is also recommended; chickens can be given as much raw onions with the green food as they will eat. Treatment for worms with areca nut, turpentine, lye, tobacco dust, &c., is sometimes recommended, but these require to be used with caution, as the effect on the birds is rather severe. Further particulars can be obtained from the Department of Agriculture.

Stickfast Flea.

Last, but not least, are the notorious stickfast fleas. They are blood-sucking insects which attach themselves in considerable numbers to the comb, wattles, lobes, and around the eyes, and there they stay: hence the name "stickfast" or "stick-tight." In very bad cases they may attack other parts of the body.

Fortunately, this pest has not yet been reported in Victoria, although it has made its appearance in Western Australia, where it has proved a source of worry to the poultry-keeper. In addition to poultry, it attacks wild birds, cats, dogs, horses, and other mammals. Its effect on chickens is very severe, and mortality as high as 85 per cent. has been reported in some countries.

During its life the stickfast flea undergoes a complete change of form. The adults sometimes lay their eggs on the ground, or they may lay them whilst on the bird, but the eggs are not glued to the feathers in the same way as are those of the louse. Small legless grubs, about one-twenty-third of an inch in length, hatch from the eggs, and feed on the organic matter in the soil, and when they grow to maturity burrow from 3 to 6 inches into the ground to spin their cocoons. Finally, from this chrysalis stage the full-grown insect emerges.

To eradicate these fleas it would be necessary to clean out the houses and yards well, and spray and treat the ground, so as to destroy the grubs and eggs. For treating the birds, olive oil should be applied direct to the fleas on the birds. Mr. W. T. Richardson, Poultry Expert, Department of Agriculture, Perth, Western Australia, states that experiments show that very frequent applications have to be resorted to if the pest is to be kept under control, and this entails a large amount of labour and expense. A plan that has been adopted recently, and which has given very gratifying results, is to have the floors of the fowl-houses cemented. This prevents the grubs from burrowing into the ground, and interferes with the life cycle of the insect.

Conclusion.

Poultry-keepers should be careful when buying poultry that they do not purchase from infested yards, and as a further precaution all birds should be carefully examined before being liberated.

SUPPLEMENTARY LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1927.

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash as Chloride	Price charged per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Bone and Flesh.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
Mixed Fertilizers, containing Nitrogen, Phosphoric Acid and Potash, readily soluble		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Dissolved Guano	A1 ..	..	5·00	..	..	..	5·00	7·00	1·50	1·50	10·00	1·47	19 0 0	H. C. Pannifex & Co., 26a Market-st., Melbourne
Complete Manure	Victor Plant Food, No. 2	..	·04	..	3·96	..	4·00	6·40	1·40	1·30	9·10	1·00	15 0 0	Victor Plant Food & Gardening Co. Pty. Ltd., 136 Dandenong-rd., Caulfield
Containing Nitrogen and Phosphoric Acid, readily soluble														
Ammonium Phosphate	Di Ammonphos I.G., BA over S.F. in circle	..	20·60	..	..	..	20·60	52·50	..	..	52·50	..	37 10 0	Dyes and Chemicals (Aust.) Ltd., 573-585 Lonsdale-st., Melbourne
Containing Nitrogen and Phosphoric Acid, slowly soluble														
Blood and Bone	Arch Blood and Bone Fertilizer	..	..	..	6·00	..	6·00	..	7·42	7·27	14·69	..	9 0 0	The Amalgamated Freezing Co. (Vic.) Pty. Ltd., 499 Little Collins-st., Melbourne
" " ..	Bendigo Blood and Bone Fertilizer	..	..	..	7·85	..	7·85	..	4·39	4·41	8·80	..	9 10 0	" " "
" " ..	Donald Blood and Bone Fertilizer	..	..	..	7·87	..	7·87	..	4·75	4·43	9·18	..	9 10 0	" " "

SUPPLEMENTARY LIST OF FERTILIZERS REGISTERED AT THE OFFICE OF THE DIRECTOR OF AGRICULTURE UNDER THE FERTILIZERS ACT 1915 (No. 2652) FOR THE YEAR 1927.—*continued.*

Description of Fertilizer.	Brand.	Nitrogen.						Phosphoric Acid.				Potash as Chloride	Price charged per ton.	Where Obtainable.
		As Nitrate.	As Ammonia.	As Blood.	As Blood and Bone.	As Bone and Flesh.	Total.	As Water Soluble.	As Citrate Soluble.	As Citrate Insoluble.	Total.			
		%	%	%	%	%	%	%	%	%	%	%	£ s. d.	
Mainly Nitrogenous														
Dried Blood ..	Arch ..	..	..	11·74	..	..	11·74	..	..	..	2·87	..	12 10 0	The Amalgamated Freezing Co. (Vic.) Pty. Ltd., 499 Little Collins-st., Melbourne
„ „ ..	Pannifex's ..	..	..	11·00	..	..	11·00	..	..	..	·50	1·10	16 0 0	H. C. Pannifex & Co., 26a Market-st., Melbourne

Description of Fertilizer.	Brand.	Nitrogen.	Phosphoric Acid.	Mechanical Condition.		Price charged per ton.	Where obtainable.
				Fine Bone.	Coarse Bone.		
Containing Nitrogen and Phosphoric Acid, slowly soluble.		%	%	%	%	£ s. d.	
Bone dust	Pioneer Bone dust..	3·05	23·68	28	72	9 2 6	W. A. Rainey, Mepunga East
Bone dust	Echuca Bone dust.	4·25	16·75	42	58	9 0 0	W. G. Boyle, Goldbourne-rd., Echuca

Melbourne, 5th May, 1927.

P. RANKIN SCOTT, Chemist for Agriculture.

PLANTING AND RECONSTITUTION OF VINEYARDS.

Conditions Governing the Distribution of Phylloxera-Resistant Vine Rootlings and Cuttings.

The conditions subject to which Victorian vine-growers may purchase phylloxera-resistant vine cuttings and rootlings (grafted and ungrafted) from the State Vine Nursery, at Wahgunyah, have been drawn up for the current year, and copies of same are available on application.

Beyond certain alterations of dates, the conditions are much the same as for last season. There is no alteration in price.

DATES BEFORE WHICH APPLICATIONS MUST BE MADE.

For Grafted Rootlings (1928 distribution, June to August inclusive) applications will be received until 31st May. (For the 1927 distribution the time for receiving applications closed on the 31st May, 1926, and present applicants cannot be supplied until 1928.)

For Ungrafted Rootlings, to be distributed from July to August, 1927, inclusive, applications will be received until 30th June, 1927. After these dates applicants can be supplied only in the event of there being a surplus, after all regular applications have been satisfied.

Applicants are required to finally decide, when filling in their application forms, as to their stock and scion requirements; no amendment can be permitted later.

PRICES.

It will suffice here to explain that resistant vines are supplied to intending planters in any of the following forms, and at the prices stated; packing extra, in the case of consignments forwarded by rail:—

Resistant rootlings, grafted with scions previously supplied by applicants, at per 1,000, £12 (Deposit, 30s. per 1,000).

Resistant rootlings, ungrafted, at per 1,000, £3 (Deposit, 15s. per 1,000).

Resistant cuttings, at per 1,000, £1 10s.

APPLICATION FORMS.

No application will be entertained unless made on the forms supplied for the purpose, which are obtainable from the Horticultural Superintendent, Department of Agriculture, 605 Flinders-street, Melbourne, or from the Manager, Viticultural Station, Rutherglen.

Separate forms are provided for (*a*) Grafted Rootlings; (*b*) Ungrafted Rootlings and Cuttings. Applications must be filled in on the proper forms, and accompanied by a deposit as specified above.

Each applicant for forms will be supplied with a copy of the detailed conditions governing the distribution of phylloxera-resistant vine rootlings (grafted and ungrafted) and cuttings.

Applicants are earnestly requested to thoroughly familiarize themselves with these. *They are warned that under no circumstances can any departure be permitted from the regulations governing the distribution as detailed therein, nor can any request for special consideration be entertained.*

IMPORTANT RESULTS WITH GYPSUM.

Results of Official Tests.

Success has attended the efforts of the staff of the Agricultural Department to evolve a practical method of improving the texture of the stiff red clay lands, patches of which occur on most farms in the Wimmera.

Hereunder are the results of a series of experiments with gypsum conducted by the Department at Salisbury in co-operation with Mr. W. E. Dahlenburg.

Seven plots, each one-third acre, sown 10th May with Federation wheat, 75 lb. per acre, and manures as under. The pickle used was copper carbonate at the rate of 2 oz. a bushel. Soil type, stiff red clay. The gypsum was placed on the land just before seed time.

	Yield.
	Bushels Per Acre.
Super. 1 cwt. per annum	19·9
,, 1 cwt. and gypsum 20 cwt.	25·0
,, 1 cwt. and gypsum 30 cwt.	24·9
,, 1 cwt. and gypsum 40 cwt.	25·9
,, 1 cwt.	19·6
,, 1 cwt. and gypsum 20 cwt.	24·9
,, 1 cwt. and gypsum 30 cwt.	24·1

During the past six years efforts have been directed towards finding a means of improving the yields on stiff red clay lands in the Wimmera. Patches of this soil exist on almost every farm there, and its value is round about £5 or £6 an acre, whereas black soil in the same paddock is worth £25 an acre.

The cultivation methods necessary for each soil type are opposed to each other. The black soil must be constantly cultivated, whereas this treatment reduces the red land to so fine a condition that it runs together in the winter and then sets like cement to the detriment of the crop. The red soil must be sown much earlier than the black to get the best results.

The object of the tests was to promote great uniformity of these soils, and it is now regarded that success has been obtained so far as the Wimmera is concerned.

The results obtained this year were typical of the experience with gypsum during the past six years. The tests were initiated at Goroke in 1921 on light soils overlying a stiff clay subsoil. The marked success of the treatment led to an extension of the tests to Salisbury, in a district where the use of gypsum was more likely to become an immediate commercial proposition than on the lower priced land at Goroke. Those plots, manured only with super. 1 cwt. an acre, gave an average yield of 19.7 bushels per acre; the addition of from 20 to 30 cwt. of gypsum has raised this yield by from 4.8 to 6.2 bushels an acre, the plot receiving 40 cwt. of gypsum yielding 25.9 bushels per acre.

Gypsum (copi) exists naturally in deposits scattered throughout the Wimmera, and even more extensively in the Mallee. The material occurs at or close to the surface, and merely has to be sieved before being bagged ready for use. Farmers who purchase their supplies in bulk

in truck lots obtain it at as low a price as 12s. 6d. a ton on rails ex deposit. If purchased with discrimination, it could be landed on any Wimmera farm at between 20s. and 25s. 6d. a ton in bulk. Thus a dressing of one ton an acre would cost say 30s. per acre dressed on the farm. The tests showed that this expenditure was practically recouped at the end of the first year. Dressings need not be repeated for a period of at least five years, so that the value of the increased crop induced by the gypsum in subsequent years is all to the good.

Gypsum is best applied to the surface of the fallow in the early spring, but it is satisfactory even when put on at seed time, as was the case in the Salisbury experiment.

It is emphasized that the Department does not recommend the use of gypsum as a commercial proposition beyond the Wimmera, as the tests elsewhere have not yet been completed.

EXPORT OF GRAPES.

Trial Shipment to Great Britain.

With the object of testing the market in Canada for Victorian grapes, the Department of Agriculture has arranged for an experimental shipment to Vancouver by the s.s. *Aorangi*, which leaves Sydney on the 5th May. The consignment, which consists of 75 cases, mostly of the Chanex variety, is being shipped to Mr. W. Cattanach, Chairman of the State Rivers and Water Supply Commission, who is visiting Canada partly to investigate the marketing of our primary products in that dominion.

In a statement issued by the Minister of Agriculture, Colonel Bourchier, it is pointed out that the grapes were purchased by the Department from a Shepparton grower, and packed by departmental officers in cases, the dimensions of which are 26½ inches by 13½ inches by 4½ inches.

In all, the shipment comprises 73 cases of Ohanez grapes and two cases of the variety known as Purple Cornichon. The Purple Cornichons and 63 cases of Ohanez have been packed in a single layer in cork that has been treated so that it will be free from fungous diseases. The other ten cases of Ohanez were packed in a single layer in tissue paper and wood wool.

The most suitable space available on the vessel was in the steward's locker. The consignment will thus be subject to some fluctuations in temperature during the voyage, but it is hoped that the grapes will be landed in good condition. Prior to the present season, the last consignment of Victorian grapes sent to Canada was a small lot of twelve cases of Doradillo and Waltham Cross varieties, shipped to Vancouver in 1910. These grapes were favorably commented on, and realized 20s. a case. Recently New South Wales growers sent a shipment of some 2,700 cases of Ohanez grapes to Vancouver, and satisfactory prices are said to have been realized for portion of that shipment.

A further shipment of about 50 cases of Ohanez grapes was made on the 14th May on the *Canadian Scottish*. This lot was sent to the Australian Commissioner in New York with a view of testing the market there.

ORCHARD AND GARDEN NOTES.

E. E. Pescott, F.L.S., Pomologist.

The Orchard.

Cultivation.

Cultivation work should be well on the way by this time. The ploughing should be advanced, so as to leave plenty of time for other orchard work. Autumn ploughing may be rough, but care should be taken to plough to the trees, so that a drainage furrow is left between the rows.

Manuring.

It is just possible, where heavy crops have been carried, that a top dressing of stable manure will be required to add humus to the soil. The fertility of the soil must be maintained; and, although stable and chemical manures as a general rule are of undoubted value as tree stimulants, well-cultivated and thoroughly tilled land will always carry fair crops with far less manure. Further, if the orchard land is well drained, cultivated, and sub-soiled, any manures that are used will be far more beneficial to the trees. The more suitable the conditions that are given to the trees, the better they can appreciate and assimilate their food.

Perhaps the most useful and valuable of manures is stable manure It is of great use, not only as a manure and as an introducer of necessary bacteria into the soil, but its value in adding humus to the soil is incalculable. Organic matter, such as stable manure, introduced into the soil quickly becomes humus; this greatly ameliorates and improves soil conditions. It is impossible to say what quantity of stable manure is necessary per acre; that can be determined only by circumstances. Orchards in different climates and varying soils will require differing quantities. A too liberal use of stable manure will be over-stimulating in most cases, and at all times an excess beyond what is necessary for present use will only be waste, as humus is readily lost from the soil, once it is in an available food form.

It has been pointed out in these notes previously that an improved physical condition is far more profitable to the fruit-grower than the continued use of manures. A tree will be far more productive if it is happy in its soil conditions; uncomfortable conditions will always result in unprosperous trees.

A dressing of lime, using about 4 or 5 cwt. per acre, is of great value in stiff or heavy orchard lands; and it may be given at this season. The lime, which must be fresh, should be distributed in small heaps between the trees, covered with a layer of soil, and allowed to remain for a few days before ploughing or harrowing in.

PESTS.

The advice given last month for spraying should be followed, particularly where any oil emulsions or washes are to be used.

Orchards will benefit if an attack is now made upon the Codlin moth. All hiding places, nooks, and crannies, where the larvæ have hidden, should be thoroughly searched and cleaned out. The orchardist has far more time now to do this work than he will have in the spring time.

GENERAL WORK.

Drainage systems should now be extended with as little loss of time as possible.

New planting areas should be prepared, and sub-soiled or trenched wherever possible.

The Vegetable Garden.

Weeds must be kept down in the vegetable garden. Weeds are generally free growing at this season; their growth is very insidious, and they will crowd out the young seedlings or plants in a very quick time. Hoeing and hand weeding must be resorted to, preferably hoeing. The frequent use of the hoe in winter time is of much benefit in the vegetable garden. A varied assortment of crops is now being produced; and if these can be kept growing much better crops will result. The soil quickly stagnates in the winter, and the only way to prevent this is to keep the surface stirred. Thus, a double service is performed with the aid of the hoe.

The application of lime is of great necessity at this season. In addition to amending unhealthy and unsuitable soil conditions, lime is particularly useful as an insecticide. It assists in destroying in immense numbers both eggs and insects that would breed and live in the ground ready to do damage to all classes of vegetable crops. Therefore, wherever possible, the soil should receive an application of lime. The garden should, as well, be manured with stable manure, but not for some weeks after the lime application.

Cabbage and cauliflower plants may be planted out; and seeds of parsnips, carrots, onions, peas, and broad beans may be sown.

The Flower Garden.

The whole flower section should now be thoroughly dug over. All beds should be cleaned up, top dressed with manure, and well dug. The light rubbish, such as foliage, twiggy growths, weeds, &c., may all be dug in, and they will thus form a useful addition to the soil. These should never be wasted. Only the coarser and stouter growths should be carted away for burning, and then the ashes may be used as manure. No part, whatever, of garden rubbish or litter need be wasted. In one form or another it should be replaced in the soil.

May is a good month for establishing new gardens, and for planting out. All deciduous plants and shrubs may now be planted. It is not necessary to dig a deep hole for planting. A hole in which the roots of the plant can be comfortably arranged, without crowding or cramping,

will be quite sufficient for the purpose, the soil around being very well cultivated.

Continue to sow seeds of hardy annuals, including sweet peas, although the main crop of sweet peas should by this time be well above ground. Where there has been any overplanting, the young plants will readily stand transplanting, and this will greatly assist those that are to remain. Annuals should not be crowded in the beds. They require ample room for suitable development, and thus the seeds should be sown thinly or the plants set out a good distance from each other.

All herbaceous perennials that have finished blooming may now be cut down. Included amongst these are phlox, delphiniums, &c. If these are to remain in their present situation for another season it is always an advantage to raise them somewhat, by slightly lifting them with a fork, so that too much water will not settle around the crowns; they may also be mulched with stable manure, or the manure may be forked into the soil around the crowns.

REMINDERS FOR JUNE.

LIVE STOCK.

Horses.—Those stabled and in regular work should be fed liberally. Those doing fast or heavy work should be clipped; if not wholly, then trace high. Those not rugged on coming into the stable at night should be wiped down and in half-an-hour's time rugged or covered with bags until the coat is dry. Old horses and weaned foals should be given crushed oats. Grass-fed working horses should be given hay or straw, if there is no old grass, to counteract the purging effects of the young growth. Old and badly-conditioned horses should be given some boiled barley. Paddocked horses should be looked at from time to time to ascertain if they are doing satisfactorily

Cattle.—Cows, if not housed, should be rugged. Rugs should be removed. and aired in the day-time when the shade temperature reaches 60 degrees. Give a ration of hay or straw, whole or chaffed, to counteract the purging effects of young grass. Cows about to calve, if over-fat, should be put into a paddock in which the feed is not too abundant. If in low condition feed well to tide them over the period and stimulate milk flow. It should be borne in mind that the cows most liable to milk fever are those that have been low in condition and are rapidly thriving. A leaflet on the treatment advised is obtainable on application to the Department. It will generally be found most profitable to have cows calve in autumn. They will then pay well for feeding through the winter, and will flush again with the spring grass. Calves should be provided with a warm dry shed. Cows and heifers for early autumn calving may be put to the bull. Observe strict cleanliness and regularity with regard to temperature and quantity of feed to avoid losses and sickness incidental to calf rearing.—Leaflet on "Calf Rearing" on application.

Pigs.—Supply plenty of bedding in well-ventilated sties. Sows in fine weather should be given grass or lucerne run. Bulletin on the Pig Industry is now available.

To get the best results, pigs should be bred and fed on the lines prescribed in articles printed in this *Journal* for May, June, July, August, September, and October of last year.

SHEEP.—As June is the month in which the bulk of the lambs are dropped in Victoria, careful attention should be given to all flocks of lambing ewes. Two- and four-teeth ewes, particularly merino and fine-woolled crosses lambing to English rams, often have trouble. During the peak period of lambing, the flock-owner should visit the paddock at least three times a day (early in the morning, midday for any special cases, and late evening are the best times), so that aid may be given to any young ewes that are having abnormal difficulty in parturition. It is not wise, of course, to disturb the flock unnecessarily at this stage, and sheep dogs should not be allowed to accompany the flock-master on his daily rounds.

It may be found advisable to induce the young ewe to take to her lamb immediately after birth; to help in this a small enclosure of stone, wood, or brick might be built in a convenient place; the ewe, with her lamb, should be put therein for a few hours; the result will usually prove worth the trouble.

Mark ram lambs as soon as possible; this can be done any time after a week from date of dropping, and should not be left later than one month. A good idea is to construct temporary yards in the paddock made with stakes, wire-netting, and a few hurdles, so that the marked lambs can be dropped on to clean pasture.

Flocks of dry sheep should be attended to regularly, and, if necessary, crutched, the wool removed from around the eyes, hoofs pared, and treatment administered in case of worms, or flies, or foot-rot. Hoofs can be pared easily during the winter months; it should be remembered that overgrown hoofs are conducive to lameness, and even to foot-rot.

Stud sheep intended for exhibition should be given special feed from now on, and their wool looked to for general protection.

Foxes are more ravenous during the winter months. Sparrows, starlings, and parrots are good bait. Poisoning the carcasses of lambs usually accounts for scavenger foxes only. Powdered strychnine just sufficient to cover a three-penny piece is the usual dose to apply to a bait.

POULTRY.—Supplies of shell grit and charcoal should always be available. Sow a mixture of English grass and clover; this not only removes taint in soil but provides excellent green fodder for stock. Where possible, lucerne and silver beet should now be sown for summer feed; liver (cooked) and maize aids to egg production during cold weather. Morning mash should be mixed with liver soup given to the birds warm in a crumbly condition. All yards should be drained to ensure comfort for the birds.

CULTIVATION.

FARM.—Plough potato land. Land to be sown later on with potatoes, mangolds, maize, and millet may be dressed with stable manure and well worked. Sow malting barley and sow cereals. Lift and store mangolds, turnips, &c. Clean out drains and water furrows. Clean up and stack manure in heaps protected from the weather.

VINEYARD.—Thoroughly prepare for plantation, land already sub-soiled for the purpose. Remember that the freer it is kept from weeds from this forward, the less trouble will there be from cut-worms next spring. Applications for grafted resistant rootlings and cuttings must be made before the end of the month—see current issue. Pruning and ploughing should be actively proceeded with. In northern districts plough to a depth of seven or eight inches Manures should be applied as early as possible.

Cellar.—Rack all wines which have not been previously dealt with. Fortify sweet wines to full strength.

ORCHARD.—Finish ploughing; plant young trees; spray with red oil or petroleum for scales, mites, aphis, &c.; carry out drainage system; clean out drains; commence pruning.

VEGETABLE GARDEN.—Prepare beds for crops; cultivate deeply; practise rotation in planting out; renovate asparagus beds; plant out all seedlings; sow radish, peas, broad beans, leeks, spinach, lettuce, carrot, &c.; plant rhubarb.

FLOWER GARDEN.—Continue digging and manuring; dig all weeds and leafy growths; plant out shrubs, roses, &c.; plant rose cuttings; prune deciduous trees and shrubs; sow sweet peas and plant out seedlings.

PHALARIS COMMUTATA

(*Syn. Bulbosa*)

The King of all Winter Grasses

Is specially recommended to Graziers & Dairymen

Being particularly productive throughout the year. It has proved itself as one of the best grasses for green cutting, hay, or feeding off. It grows between 6 and 7 feet high, and resists frosts and droughts. It has nice, soft, succulent blades and flowering stems, and can be cut three to four times in a year. Sow 2 lb. per acre in drills, or 4 lb. broadcast.

Seed 7/6 lb., 7/- lb. in 28-lb. lots or more

LAW, SOMNER PTY. LTD.

Seed Merchants and Nurserymen

BLOCK PLACE and 83 SWANSTON ST., MELBOURNE

PHONE: 7131

POSTED FREE

AUSTRALASIA'S FINEST & MOST COMPREHENSIVE SEED & PLANT CATALOGUE AND STANDARD GUIDE

Everything for the Farm, Garden, and Orchard.

Our 1927 Publication

160 Pages. Beautifully Illustrated.

NOVELTIES and SPECIALTIES FROM ALL PARTS OF THE WORLD

AGRICULTURAL SEEDS specially featured

World-famed "TIP TOP" SEEDS.

LAW, SOMNER PTY. LTD. ESTD. 1850

Seed Merchants and Nurserymen, BLOCK PLACE, MELBOURNE.

Contractors to various Governments. Shippers to all parts of the world

FOR THE HOME **PUMPS** FOR THE FARM

We have a wide range of Pumps and Pumping Machinery, which are made in our Engineering Works at Melbourne and Sydney. Our very long experience in the manufacture of Pumps and Irrigation Plants has helped us in the designing and construction of Billabong Pumps.

All Billabong Pumps

are made specially to suit Australian conditions by skilled workmen, and only high-grade materials enter into their manufacture. Write us *re* your requirements in Pumps and Pumping Machinery, and full particulars with prices will be forwarded Post Free.

The Pumps Illustrated: Billabong Low-Down, Billabong Semi-Rotary, Billabong Hydraulic Ram, Billabong Cistern, Billabong Centrifugal, Billabong Piston.

CATALOGUE POST FREE

Bore Casing, 4 in. and 5 in., in Black or Galvanized. *Prices on application.*

MAKERS *of* Windmills

JOHN DANKS & SON PTY. LTD.
DANKS
391-403 BOURKE ST. MELB.

MAKERS *of* Troughing

324-330 Pitt Street, Sydney

Economy, full power output and easy continuous working are special features of

CROSS

POWER

KEROSENE

The British Imperial Oil Co. Ltd. Throughout Australia and New Zealand

CK40

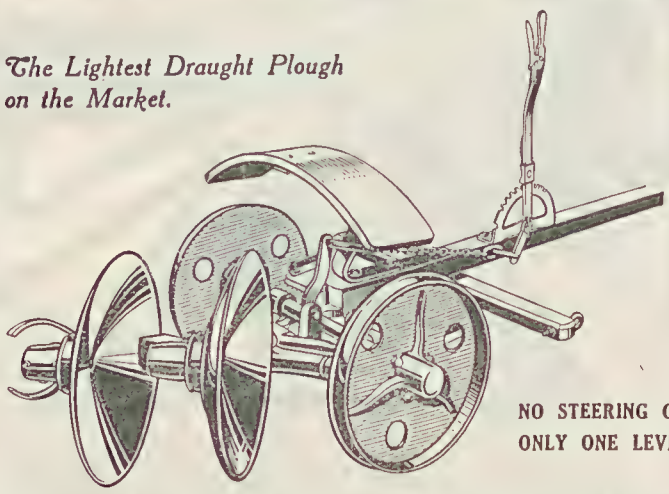
FARMERS—IRRIGATIONISTS—HILLSIDERS

Let TWO Horses do the WORK of FOUR

BY USING

SHAVE'S Patent Reversible Stump-Jump Disc Plough

The Lightest Draught Plough on the Market.



NO STEERING GEAR—
ONLY ONE LEVER

It will plough Banks and Rough Country without bridging any ground.

It will not sideslip on any hill—*no matter what grade it is.*

If trees are cut level with the ground, the Discs being STUMP-JUMP will PASS OVER the stumps or any roots, &c., that may be present.

It is FITTED WITH SHOES which are PERMANENT DEPTH GAUGES, and which are invaluable in SOFT or MARSHY country.

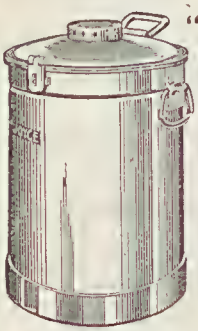
Scientifically lubricated with only Five oiling points, the DISCS are fitted with patent type of AXLES, which revolve IN AN OIL BATH, and therefore these bearings are always lubricated.

An Australian designed it—and it is being MADE BY AUSTRALIANS FOR AUSTRALIANS. You will be doing your country a good turn, ALSO YOURSELF by using a SHAVE'S PLOUGH.

Further Particulars with pleasure on Application

D. & W. CHANDLER LTD.

276-294 Brunswick Street - - FITZROY, MELBOURNE



"JOYCE" DAIRY CANS

ENTIRELY SEAMLESS

MILK CANS		CREAM CANS	
20 Quart	24/-	3 Gallon	21/6
24 ,, ...	26/-	5 ,, ...	23/-
30 ,, ...	28/-	8 ,, ...	29/6
40 ,, ...	32/-	10 ,, ...	31/-
50 ,, ...	35/-		

Name plates free, and freight paid per goods to nearest station in Victoria.

"JOYCE" Products for SATISFACTION

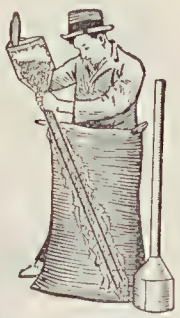
Obtainable from Butter Factories, Stores, &c.

Aspinall Bag Filler

(Patented)

WILL SHOW YOU A BIG SAVING IN WHEAT AND BAGS

One man can fill and sew 200 bags per day, averaging 3 bushels 20 lb. per bag.
With this Filler it is quite easy to put 10 ordinary bags into 9 bags.
Strongly made of galvanized iron, weighs only 5½ lb., and 47 inches over all—anything shorter cannot reach and fill the bottom corners of the bag.
You cannot afford to be without one this year.



PRICE—20/- each, Freight Paid for Cash

Sole Makers:

A. JOYCE & Co. Pty. Ltd. 595 ELIZABETH ST. MELBOURNE

"Gorgon Oval"

GALVANIZED

Fencing Wire

BRITISH MADE

10 x 12 gauge
12 x 14 gauge

STRONGEST *yet* CHEAPEST Wire on Market

Full Particulars from—

Jas. Henty & Co.

499 Lit. Collins Street
MELBOURNE

This Journal

offers exceptional advantages

for Advertising

Circulates throughout the **Country Districts** of **Victoria** and amongst **Farmers** of the **Commonwealth**, reaching also country professional men, tradesmen, schoolmasters, teachers, and the like.

Exceptionally satisfactory results have followed the advertising of Stud Stock in this Journal.

Rates on application to the Official Canvasser

Mrs. Hemming, 26 Sutherland Rd., Armadale

Get Every Penny of PROFIT Out of Your Land

THE value of Top Dressing is now generally acknowledged—and the MUNRO Top Dressing machine has become firmly established with successful farmers. Designed to give long and honest service, the machine has in every way justified its makers' claims. It affords the maximum of strength and greatest efficiency in operation, and still compares favorably in price with the ordinary Top Dresser.

Write for our illustrated folder, giving details of these exclusive MUNRO features :—

(1) The Heavy Angle Steel Frame
(2) Axle Built on this Frame
(3) Heavy Unbreakable Gears
(4) Flexibility—70 to 400 lb. per acre
(5) Waterproof galvanized Iron Cover
(6) Wind Shield
(7) Staggered Wheels
and many other improvements.

Name of Nearest Agent on request.

George Munro Pty. Ltd.
YUILLE STREET,
BALLARAT

P.O. Box 80. - 'Phone 823.

Australian made—100% efficient

The **MUNRO TOP DRESSER**

Catalogues illustrating and describing other MUNRO Products, including Oil and Petrol Engines, Saw Benches, Hay and Wheat Elevators, Wool Presses, Travelling, Portable, and Stationary Chaffcutters, will be mailed to any address on request.

THE STATE SAVINGS BANK OF VICTORIA

CREDIT FONCIER LOANS

ON FARM PROPERTIES

Up to two-thirds of valuation in sums from £50 to £2,000, repayable by instalments spread over 27½ years.

Interest 6 per cent.

Special Terms for Discharged Soldiers and Dependants, also those who were in the Red Cross and Transport Services, up to three-fourths of valuation, repayable by instalments spread over 30¼ years.

Interest 5¼ per cent.

NO CHARGE FOR MORTGAGE DEED

Application forms at any Branch of the State Savings Bank or by writing to the General Manager.

Head Office:
139-149 Elizabeth Street, Melbourne.

GEO. E. EMERY,
General Manager.

LUCERNE

THE KING OF FODDER · CROPS

FOR OVER THIRTY YEARS we have been handling lucerne seed in large quantities, and it follows naturally that we have gained a wealth of experience. We have built up a most modern and efficient cleaning and testing plant, and from the start our aims have been excellence of strain, purity of sample, and high percentage of germination.

Remember !

When you are sowing lucerne that it is a crop which is going to live and yield you returns for a number of years. Is it not then good policy to use a really good strain of pure seed ?

YATES' BROADLEAF A·Y GIANT-UPRIGHT LUCERNE

Certified
Australian Grown.

Certified
no trace of Dodder found when examined by experts.

Statement
of Purity and Growth with every bag.

Packed
in 25-lb. and 50-lb. net SEALED and BRANDED BAGS.

☞ *Write for Current Price List (and samples, if required)*

We quote F.O.B. Sydney, but pay freight and other charges to rails Melbourne.

All quotations submitted and all orders accepted are subject to our printed conditions of sale.

ARTHUR YATES & Co. Ltd.

Letters Box 2707C G.P.O.

Australia's Greatest Seed House,
184-6 SUSSEX ST., SYDNEY

Wires "SEEDSMAN," SYDNEY

By Authority: H. J. GREEN, Government Printer, Melbourne.

ESTABLISHED 1878

THE Trustees Executors & Agency Co. Ltd.

OF 412 COLLINS STREET, MELBOURNE

Directors:

SIR JOHN GRICE, Chairman.
SIR J. H. MACFARLAND, M.A., LL.D., Vice-Chairman.
HARRY EMMERTON R. O. BLACKWOOD D. STUART MURRAY
ALEXANDER STEWART

Authorized by Special Acts of Parliament to act as Trustee, Executor, Administrator, and in other trust capacities.

The Company has specialized in the management of farms and station properties

Please call or write for explanatory booklet.

CHAS. R. SMIBERT, General Manager.
V. G. WATSON, Manager.

DEPARTMENT OF AGRICULTURE

POULTRY FOR SETTLERS

Orders for Cockerels for delivery from March may now be booked from the Poultry Pens at the Central Research Farm, Werribee
Settings of Eggs can be supplied in season
1st July to 1st October orders are booked in rotation

WHITE LEGHORNS

No. 1—Pure Cosh World's Record Strain.
„ 2—From Single Tested Hens with scores of 260 to 285 eggs, Single Mated to Cocks bred from Hens with scores of 275 to 301 eggs.

UTILITY BLACK ORPINGTONS

(Founded on Christie and Cullen Strains)

No. 1—From Single Tested Hens with scores of 256 to 284 mated to Cockerels bred from Hens with scores of 272 to 313 eggs.
„ 2—From Hens bred from above mated to Cockerels bred from Single Matings.

RHODE ISLAND REDS

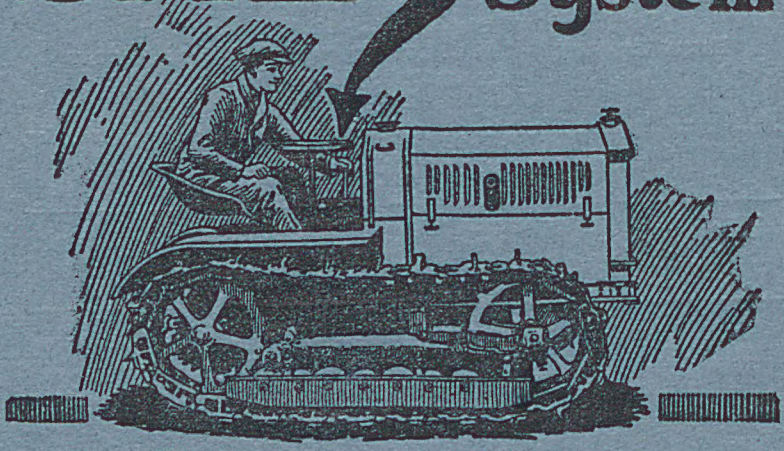
Pure Dalrymple

From Hens with scores of 250 to 275 eggs, mated to Cockerels bred from Hens with scores of 264 to 292 eggs in 12 months.

For prices and particulars apply to The Manager, Research Farm, Werribee

Cletrac Tractors

Famous "SNAP" Oiling System



On Model "K" Cletracs

Use 20-30 Cletrac

SNAP Lubrication is exactly what the name implies—a real Snap! One push of the Plunger (shown above) and—Presto! all of the lower track wheel bearings are instantly and thoroughly oiled.

There is no "time out"—not even a minute wasted, for Cletrac "K" can be oiled without even stopping the machine.

CLETRAC'S "SNAP" OILING SYSTEM has the distinct advantage of forcing fresh oil into and around the moving parts, and forcing the old oil out, and without any contact with dust and grit.

EXTRACT from letter received from Mr. Koboilke, of Gilderoy, Vic.—My two sons have been working it on a 3-furrow Mackay stump-jump disc plough in very rough, hilly country, where no other type of tractor could possibly operate.

My land is full of stump holes 5 to 6 feet in diameter, and if any other breed of tractor got into them it would never get out.

We recently did some rather interesting work ploughing a paddock in which the bracken was 3 to 4 feet high. We ploughed it all under in the first operation, and then finished the job with a 16-disc cultivator with a roller hitched on behind.

Sawing hard messmate with a 42-inch circular saw is another job, and the machine has never yet been pulled up.

I can thoroughly recommend the Cletrac, and I have had innumerable applications from my neighbours to do contract ploughing, but am too busy with my own work to consider same.

Traction Australia Pty Ltd.

469 FLINDERS ST. MELBOURNE

Cletrac Tractors

SP 630-5 V645